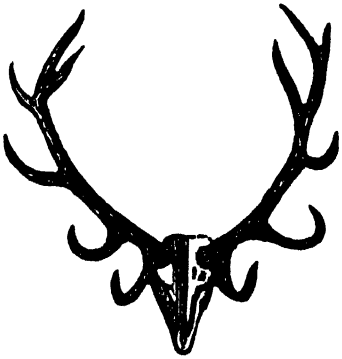
THE

Bombay Natural History Society.

1883 - 1933.

Printed in Commemoration of the
Golden Jubilee of the Society, 1933.



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THE BOMBAY NATURAL HISTORY SOCIETY

1933

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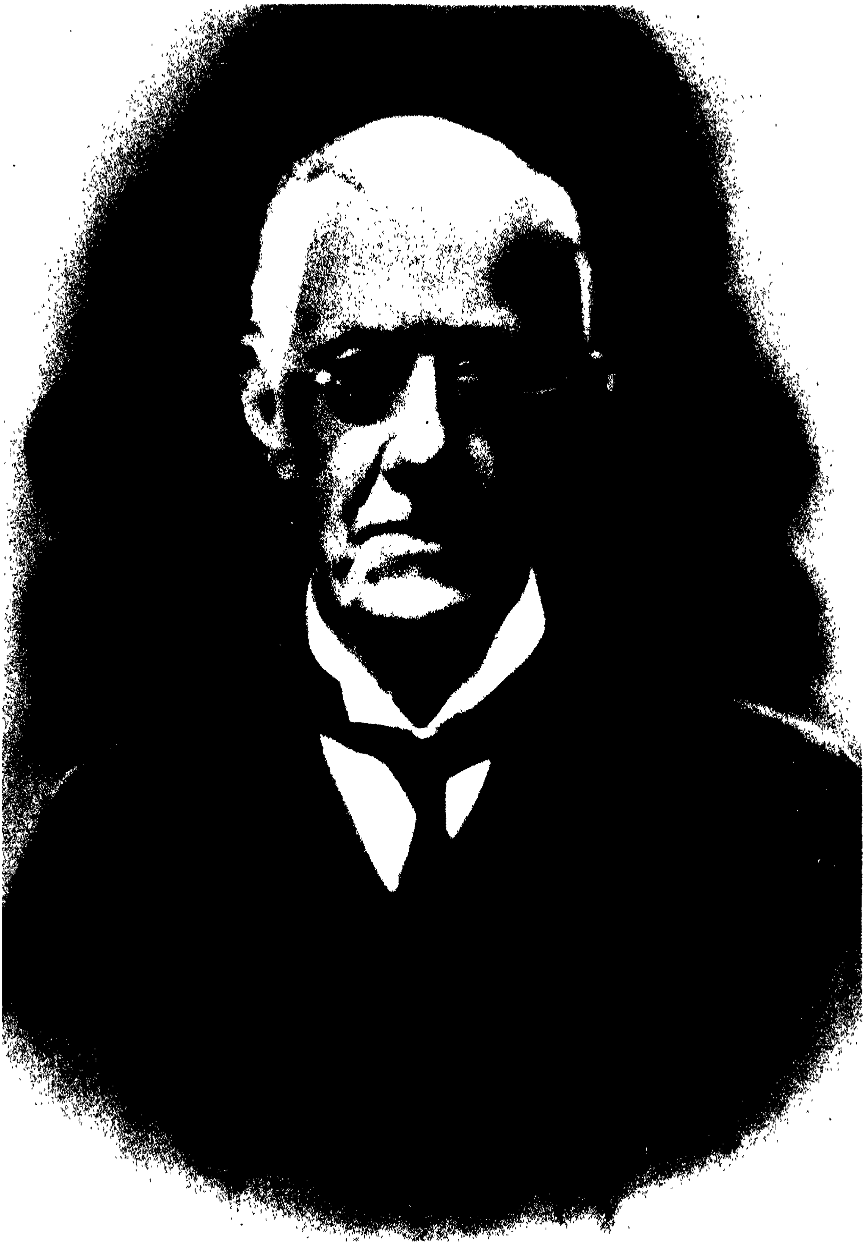


H. M. PHIPSON.

Honorary Secretary of the Society, 1886-1906.

THE BOMBAY NATURAL HISTORY SOCIETY.

OUR HISTORY

1883-1933.

1933 is the Jubilee Year of the Foundation of the Bombay Natural History Society. It was formed on the 15th September 1883 by eight residents of Bombay. Their names were:—

Dr. D. MacDonald,
Mr. E. H. Aitken,
Col. C. Swinhoe,
Mr. J. C. Anderson,
Mr. J. Johnston,
Dr. Atmaram Pandurang,
Dr. G. A. Maconochie,
Dr. Sakaram Arjun.

These eight names were traced from the earliest Minute Book of the Society—(*Vide* Note by W. S. Millard, *Journ.* B.N.H.S. Vol. XXXV, p. 196). According to Mr. E. H. Aitken, better known as 'EHA', Dr. Maconochie was the '*fons et origo*' of the Society. It was he who suggested that it would be an excellent idea to form a Society for the study of Natural History. The founders met on the 15th September 1883, in the Victoria and Albert Museum, Bombay, and constituted themselves the Bombay Natural History Society. They proposed to meet monthly and exchange notes, exhibit interesting specimens and otherwise encourage one another.

The name of Mr. H. M. Phipson was not amongst the original founders. He was on leave in England at the time, but he must have joined the Society very soon afterwards, as the introduction to the first number of the Society's journal states:—

For several months meetings were held in the Victoria and Albert Museum, but in January 1884, Mr. H. M. Phipson kindly offered the use of a room in his office at 18, Forbes Street, in the Fort. This removal to a central situation gave an astonishing impulse to the Society. The meetings were better attended, the membership increased and collections began to be made, so that in a very short time the necessity for more ample accommodation was pressingly felt. The Committee appointed to seek for suitable rooms having failed elsewhere, recommended the Society to ask Mr. Phipson to let one-half of his office premises, including the room of which they had up to this time had the gratuitous use. He consented to this and so the Society continued to hold its meetings and keep its collections at 18, Forbes Street. Its progress was so rapid however, that these premises were soon felt to be too small and the collections were removed to Mr. Phipson's larger and in every way more suitable rooms at 6, Apollo Street.

It is well known that Mr. H. M. Phipson was the backbone of the Society. From March 1886—when he took over the position of Honorary Secretary from the late Mr. E. H. Aitken—to 1906 when he left India, he originated and directed its activities. The success of the Society has been greatly due to his devoted labour and his wonderful personality.

Mr. Millard also is a link with the old founders. He joined the Society in the year 1888 and, working in close collaboration with Mr. H. M. Phipson, whilst he was in India, he carried on his work as Honorary Secretary from the time of Mr. Phipson's retirement until the time came for him to leave India—in April 1920. Millard was devoted to natural history and did the most valuable work in initiating and carrying through the Mammal Survey of India, Burma and Ceylon, a complete history of which follows later in this volume. He also started the negotiations with Government for the transfer of the Society's collections to the Prince of Wales' Museum. He was an expert gardener and it is largely to him that Bombay owes the beautiful sight of various flowering trees on Malabar Hill and throughout the city. We are most grateful to have his services at home where he is still working for the Society.

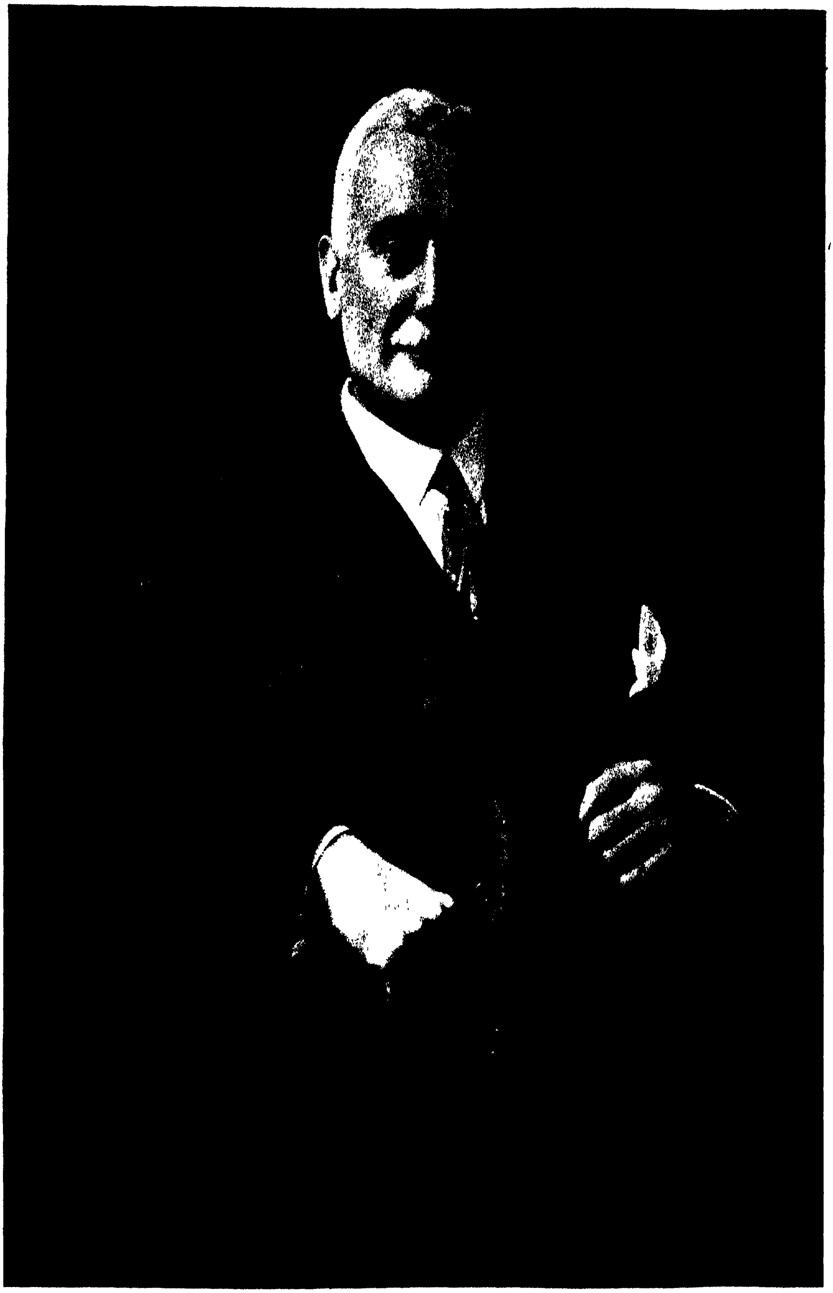
On Mr. Millard's resignation, in 1920, the office of Honorary Secretary was taken over jointly by Sir Reginald Spence and Mr. P. M. D. Sanderson. Like his predecessors in office Spence developed his enthusiasm and love for the Society and its work while yet a young assistant under Mr. Phipson. Phipson believed in the necessity of some hobby for all young men who came out to India, and he considered that no better occupation for leisure moments could be found than that offered by nature and the life out of doors. Sir Reginald Spence gave to his work as Honorary Secretary all that energy and fervour which he devoted to any task that he set his hand to. His genial personality, his popularity with all classes, the great influence which he commanded made him a tower of strength to the Society. He resigned his office on leaving India in 1934, the year after the Society's Jubilee. His departure was a great loss.

The Society grew in numbers. It is now no longer a Society of gentlemen resident in Bombay. Its membership has extended throughout India, Burma and Ceylon and to residents in England and the Colonies, in Europe and America. Its rolls include many kindred Societies, Museums and Scientific Institutions throughout the World.

Conditions have changed somewhat since the times of the Society's infancy. Were Mr. Phipson back in the Society's old rooms, the first thing that would strike him would be the absence of members, who spent their leisure hours working at the arrangement and classification of the collections.

Life in Bombay now offers other attractions for limited moments of leisure and there are few today who take as active an interest in Natural History as the men of old.

W. S. MILLARD
Honorary Secretary of the Society, 1906-1920.



Sir REGINALD SPENCE, Kt.
Honorary Secretary of the Society, 1920-1933.

E. H. Aitken, the most versatile of Naturalists, whose pen could reveal scientific fact without stripping it of that interest and charm with which Nature veils it,—genial Fr. Dreckman, s.j., whose hobby was snakes and who alarmed Lord Lamington one evening, at one of the Society's meetings by pulling several live ones out of the capacious pocket of his cassock. Lt.-Col. Kirtikar, a keen Botanist and a poet in his leisure hours, specially promoted for a deed of gallantry at Maiwand which in later days would have earned him the Victoria Cross. The Hon'ble Mr. Abercrombie, whose interest centred in 'Shells'—the number of species which bear his name testify to the zeal with which he pursued his study. R. C. Wroughton then an upcountry Forest officer, destined later to become a famous mammalogist. Other early workers in the Society's rooms were E. H. Comber, keenly interested in Birds and L. C. H. Young. Young, a Marlborough man, was a disciple of the distinguished entomologist Meyrick. He re-organised, re-set, re-catalogued the Society's Butterfly collection. Perhaps he differed from present-day entomologists' views as much as he differed from the views of his friends. A great promoter of debate, supporting one view one day, and the opposite view the next, his aim was always to arrive at the fundamental truth.

We turn now to early achievements and early failures of the Society.

ZOOLOGICAL GARDENS IN BOMBAY

The Victoria Gardens, Bombay, where the Society started on its career by holding meetings, were both botanical and zoological. Botanically they were good, thanks to the keenness and knowledge of Mr. G. Carstensen, a man who had been trained in the botanical gardens of Copenhagen. Zoologically they were then, a disgrace—the cages would have disgraced a fifth-rate travelling circus.

At a meeting of the members of the Society held on the 7th May 1888 the minutes record as follows :—

'Mr. H. M. Phipson stated that a great many valuable specimens of animals had of late been offered to the Society, which, owing to want of accommodation in their rooms in the Fort, they had been obliged to decline. He was of opinion that the time had now arrived when the Society should obtain, if possible, a convenient site on which to form a Zoological Garden of its own. Mr. Phipson reminded the members present that the finest collection of live animals in the world, the one in London, was originally started by, and had throughout been under the sole management of, a private scientific Society. There were sites in and about Bombay which would suit the purpose admirably, and if one of them could only be obtained, he felt sure that the Bombay Natural History Society was strong enough to carry out the project with success. Such a garden would, in a short time, become the chief attraction of the city, and if the entrance fee on Indian holidays did not exceed an anna, the advantages of such a place would be fully appreciated by the great mass of the people. The few animals at present kept in the Victoria Gardens at Byculla were not in a satisfactory condition, but the Municipality could not reasonably be expected to form a zoological collection at the expense of the ratepayers, and as Government had decided that no charge could be made for admission into the Victoria Gardens, after they had been so long open to the public, nothing could be done in that direction.'

The matter was taken further at a meeting of the Bombay Town Council held on the 28th June 1888 but, after the reading of a lengthy correspondence, and many speeches, further consideration was adjourned as the item on the agenda paper did not refer to one very important part of the proposal, namely the contribution to be made to the Society.

The snags of today were the snags of yesterday. 'The general public visited the gardens free of charge.' They do so now and they visit nearly everything else in Bombay, except a cinema, free and you can compare our gardens with Calcutta and our want of an Aquarium with Madras and you will see who benefits from this 'free access' complex.

'The contribution to be made to the society' was the difficulty as it is in these days of retrenchment.

The Local Council considered the matter further at its meeting on the 4th July. The discussion in the Corporation brought forth a letter from Dr. Edith Pechey who was later married to Mr. H. M. Phipson. She wrote:

'When the question of a grant towards the support of a Zoological Garden in Bombay was under consideration, a member of the Corporation objected that it was a matter for Imperial and not for Municipal liberality. This seems to me a totally wrong idea; it is as unfair to tax the ryot in distant provinces for gardens in Bombay which he will never see as it is extraordinary that there should be any hesitation on the part of Bombay citizens to support such a valuable institution.

'As regards both financial management and internal arrangement example might fairly be taken from the various Zoological Collections in the Dutch towns. These have always struck me as models of what such gardens should be; the grounds are tastefully laid out, everything is scrupulously clean, and the animals are allowed as much room and fresh air as possible, the parrots and other birds of gay plumage being distributed in summer over the grounds, where they contribute greatly to the decorative effect. I believe I am correct in saying that none of these gardens are assisted from Government funds. Those at the Hague belong to a Society and are self-supporting, thanks to their popularity with the public, the admission fees being the chief source of revenue. At Amsterdam, the Municipality contributes, and this should be the case in Bombay where, for some years at least, until the gardens become attractive enough to draw large crowds of visitors, the admission fees cannot be expected to meet the heavy expenses of laying out new gardens, and keeping up a rapidly increasing collection of animals. I trust, therefore, that no difficulty will arise in meeting the very modest request of the Bombay Natural History Society, that the very small sum expended at present upon the animals in the Victoria Gardens should be handed over with them to assist in providing them with better board and lodging elsewhere.'

A subscription list was opened by the *Times of India* and was headed by a donation of Rs. 500 from the staff of that paper.

Subscriptions were promised on condition that subscriptions of Rs. 150 will 'besides constituting subscribers life members of the Bombay Natural History Society entitle them to *free entrance for themselves and two friends at all times to the Society's garden.'* This was on the lines of the Zoological Society of London. The *Times of India* in its leading article of July 7, 1888, paid a well deserved tribute to Mr. Phipson. They wrote:

'Seldom or never has a public question in Bombay been taken up with more prompt, general, and genuine enthusiasm than the proposal to establish a Zoological Garden and Aquarium for our city. The inception of the idea is due to a gentleman to whom Bombay owes a deep debt of gratitude. He has fostered in our midst a true and growing taste for the study of natural science; he has been the heart and soul of our Natural History Society, which now possesses a numerous and influential membership and holds a recognized position alongside the leading institutions having similar objects in Europe and America; and he has formed, under circumstances of great difficulty, a zoological museum which, if small and compact, is in some departments at least fairly complete and, as a whole, forms a splendid nucleus for a representative collection of the fauna of India. Needless to say that we refer to Mr. H. M. Phipson, honorary secretary of the Bombay Natural History Society. Than Mr. Phipson few men have striven more earnestly and continuously to advance a purely unselfish cause, and we venture to add no one has laboured for the advancement of science and for the general good in a more self-effacing and unobtrusive spirit. So far as we are aware, the only public recognition of Mr. Phipson's great and valuable services is the naming of a snake after him; the *Hydrophis phipsoni* was differentiated by him and added to the known species of Indian *Ophidia*, and was very properly christened after its discoverer. To a student of nature this is no small distinction; it enrols his name for all time on what we may call the titular scroll of scientific research. The satisfaction of having been awarded such a distinction, however, may not be appreciated by the ordinary run of people; but everyone will readily recognize that the carrying to a successful issue of Mr. Phipson's proposal of a Zoological Garden for Bombay will fittingly crown his labours of many years.'

The subject was discussed at several meetings of the Town Council and Corporation.

There was subsequently a deal of correspondence as to (1) the recurring cost—estimated by Mr. Phipson at roughly Rs. 15,000 per annum. (2) The power of the Corporation to grant money to the Natural History Society—answered by the Lawyers to the effect that so long as the public had the right of access—on payment —to the grounds it was in order.

By the 4th October 1888 the subscriptions promised to the

Society had totalled Rs. 53,850 but at a meeting of the Committee of the Corporation held on that date:

'Major Selby observed that as a member of the Natural History Society he had the prosperity of that body considerably at heart; but he could not help remarking that, unless the Society had some two or three lakhs of rupees, there was not any reasonable chance of their success on the proposed site. The Society, as far as he could see, had only been able to collect about half a lakh of rupees, and they might just as well try to fly without wings.'

Our next reference to the subject is on the 18th June 1889 when the Corporation met under the presidentship of Mr. Gratton Geary—editor of the *Bombay Gazette* and one of the outstanding literary leaders of Bombay. The Corporation decided that as it was wrong to make the poor man pay a price for admission to the Gardens it was only fitting that he should go without an up-to-date Zoo. We can leave this subject here.

THE OLD MUSEUM AT 6, APOLLO STREET

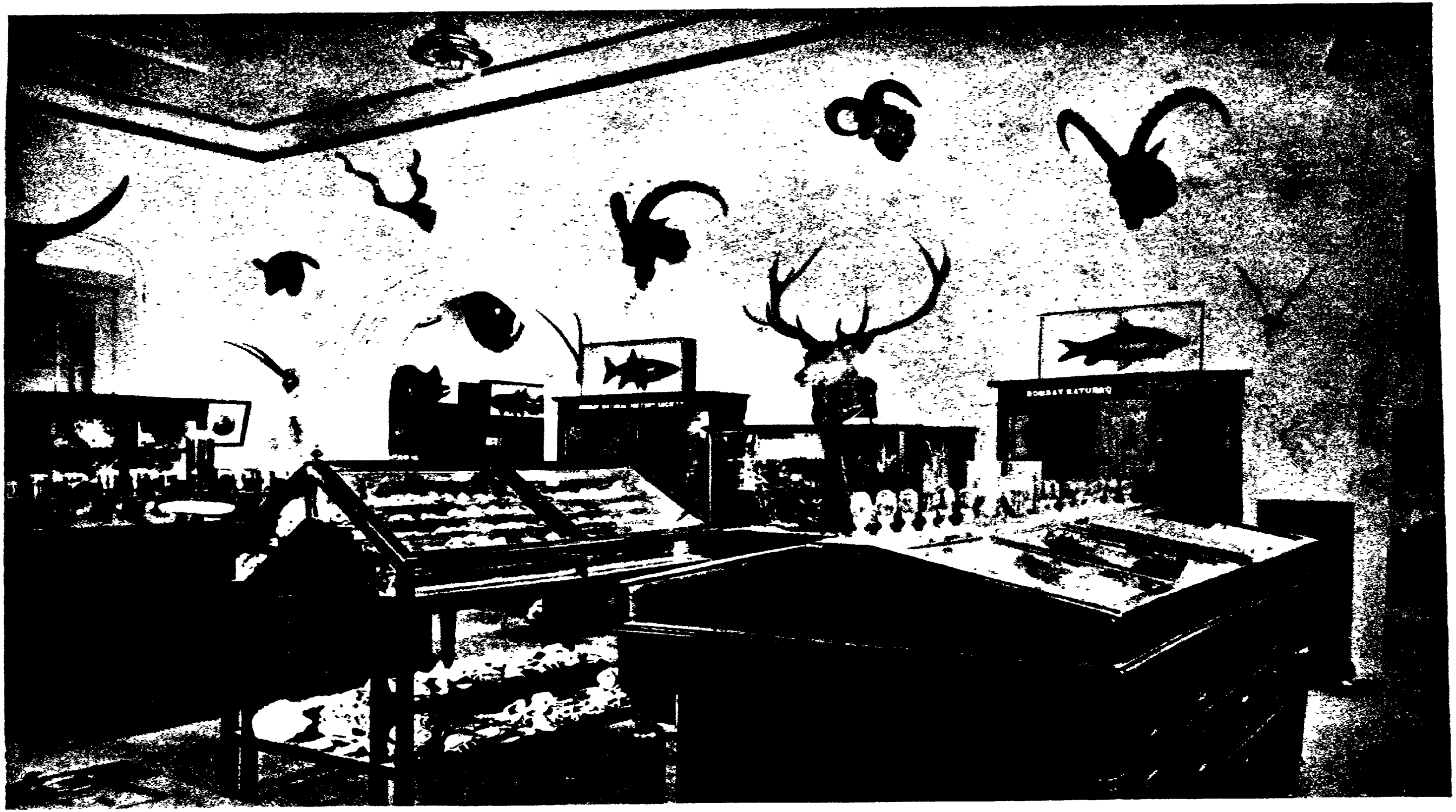
The Society's activities as regards a Zoological Garden ended in failure. Its next venture was a Museum and though to many the closing of the little Museum in Phipson & Co.'s office must have been a matter of regret—our activities as regards a Natural History Museum worthy of Bombay and India may be said to be successful.

We have already pointed out that the original members of the Society met in the Victoria and Albert Museum, later they met in Mr. Phipson's old offices in Forbes Street where they kept their collections. Mr. Phipson's growing business necessitated larger quarters. He was very glad—in taking as his offices and godowns the old residence of the Chief Justice of Bombay at 6, Apollo Street—to be able to place a goodly portion of the space at the disposal of the Society.

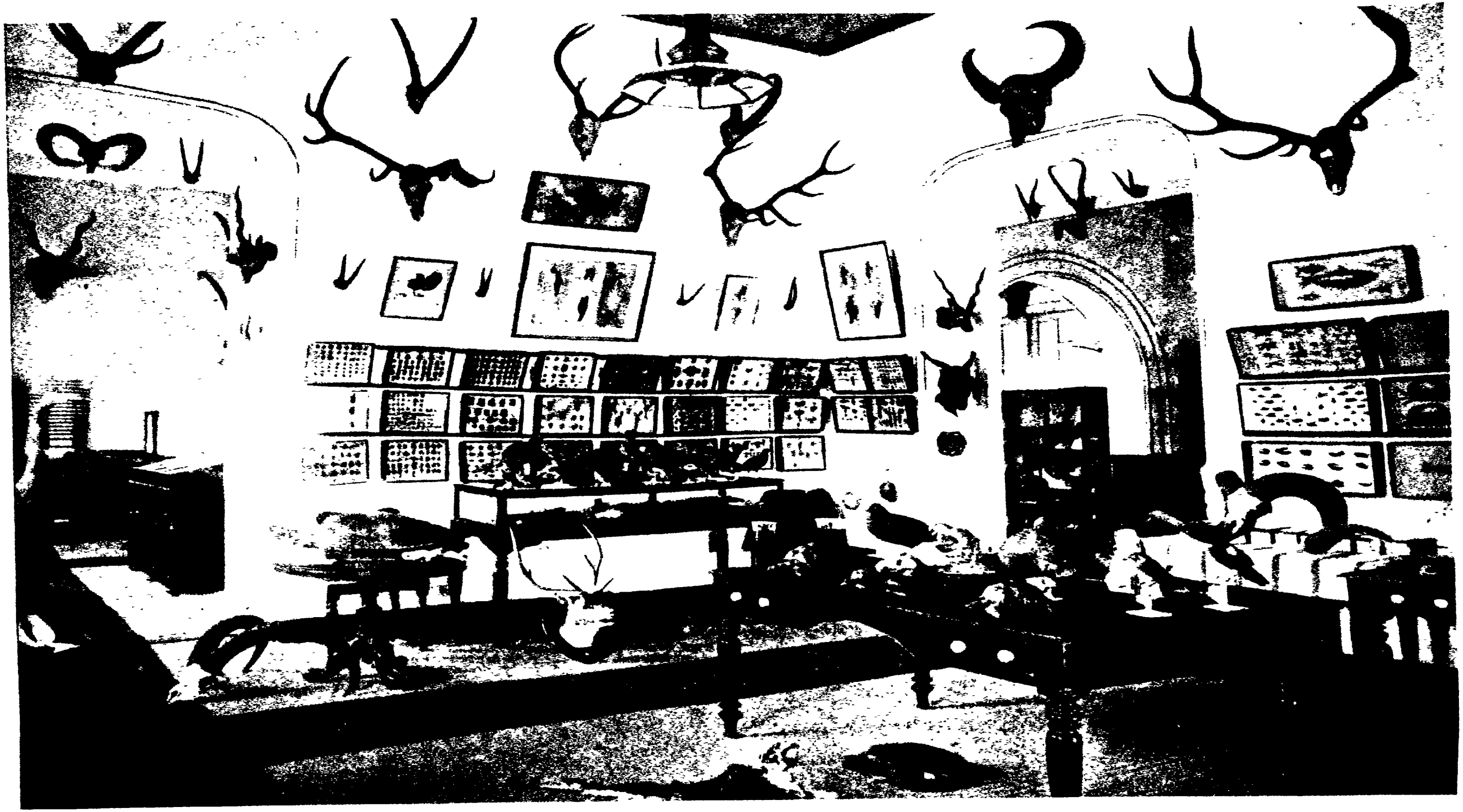
The increasing membership of the Society and the extension of its activities led to the rapid growth of its collections. Except for Surveys carried out in later years by professional collectors, employed by the Society, which brought very large accessions to the mammal and bird collections, the Society's Museum has been built up entirely by the voluntary contributions of members, resident in all parts of the Indian Empire.

The collections are confined to the Oriental region; mainly to India, Burma and Ceylon and at the present time constitute, particularly as regards Mammals and Birds, one of the most important collections illustrative of the Fauna of this area.

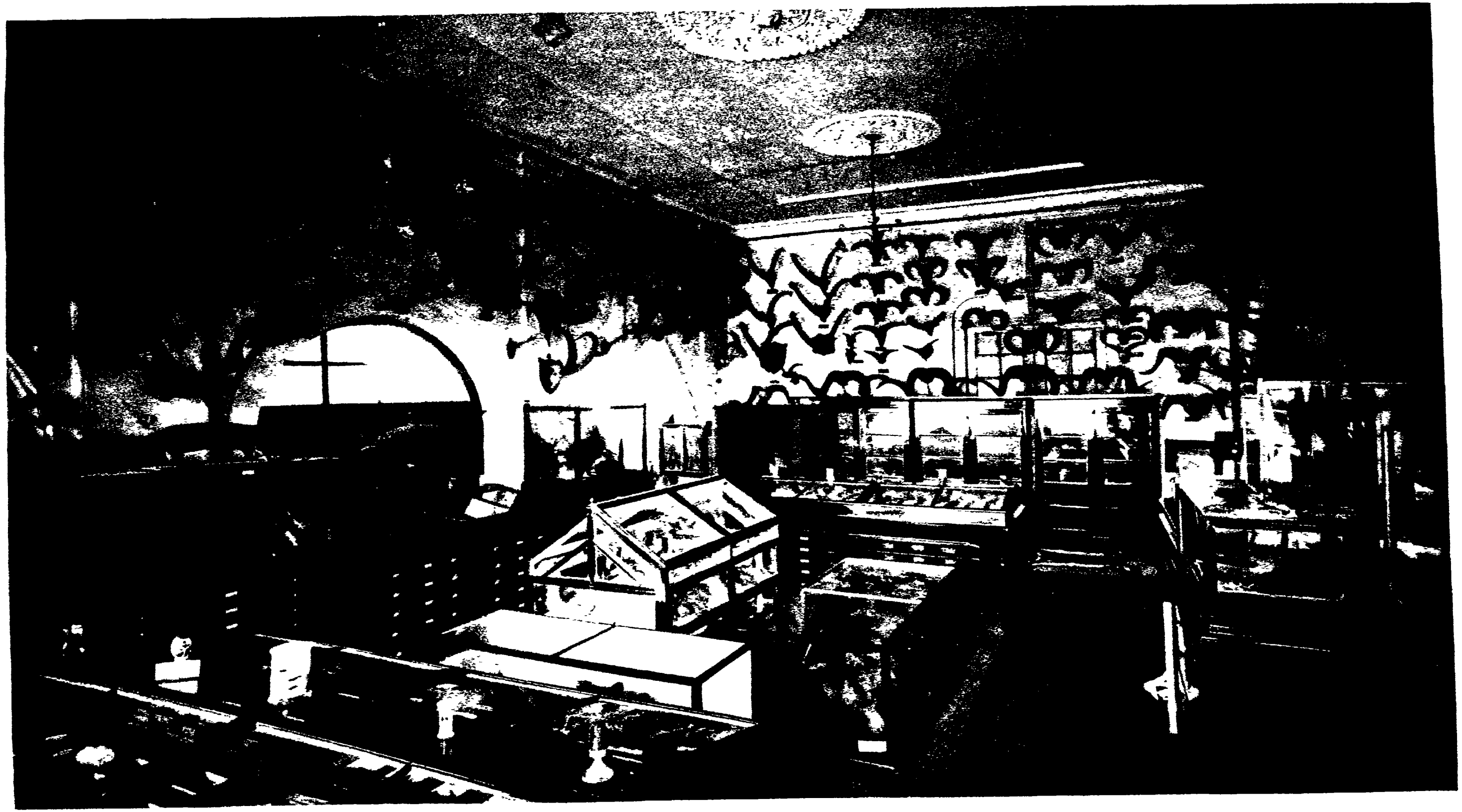
The Mammal collection is mainly the result of a Survey of the Mammals of India, Burma and Ceylon carried out by the Society of which a more detailed account is given later. Nevertheless, there were in the early days, a number of volunteer workers who helped to build up our Mammal collection and so carry on the tradition established by many distinguished naturalists during the second quarter of the nineteenth century. This was the Golden Age of



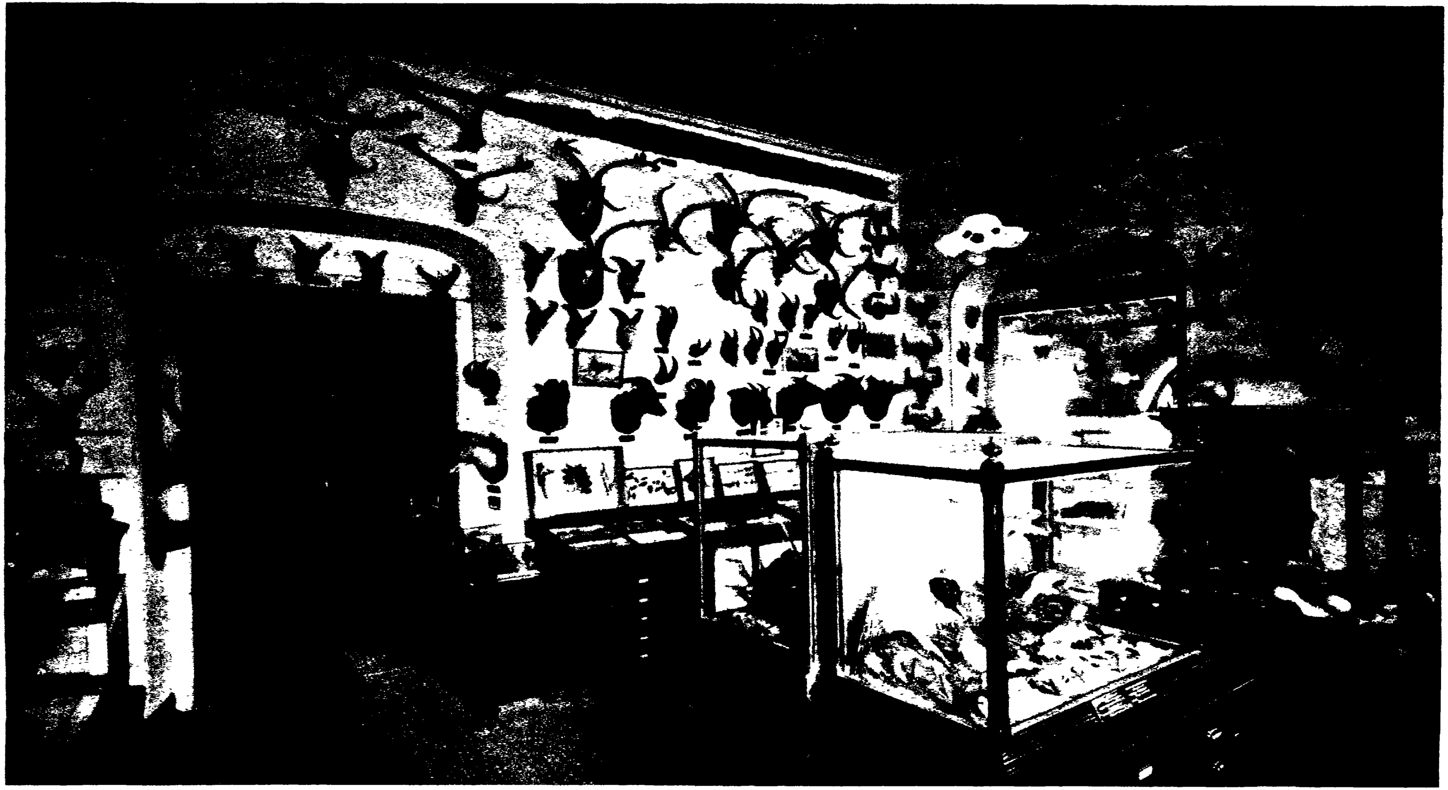
The Society's Museum at 6 Apollo Street, in 1888.



The Society's Museum at 6, Apollo Street, in 1888



The Society's Museum at 6, Apollo Street, in 1921, previous to its transfer to the Prince of Wales' Museum

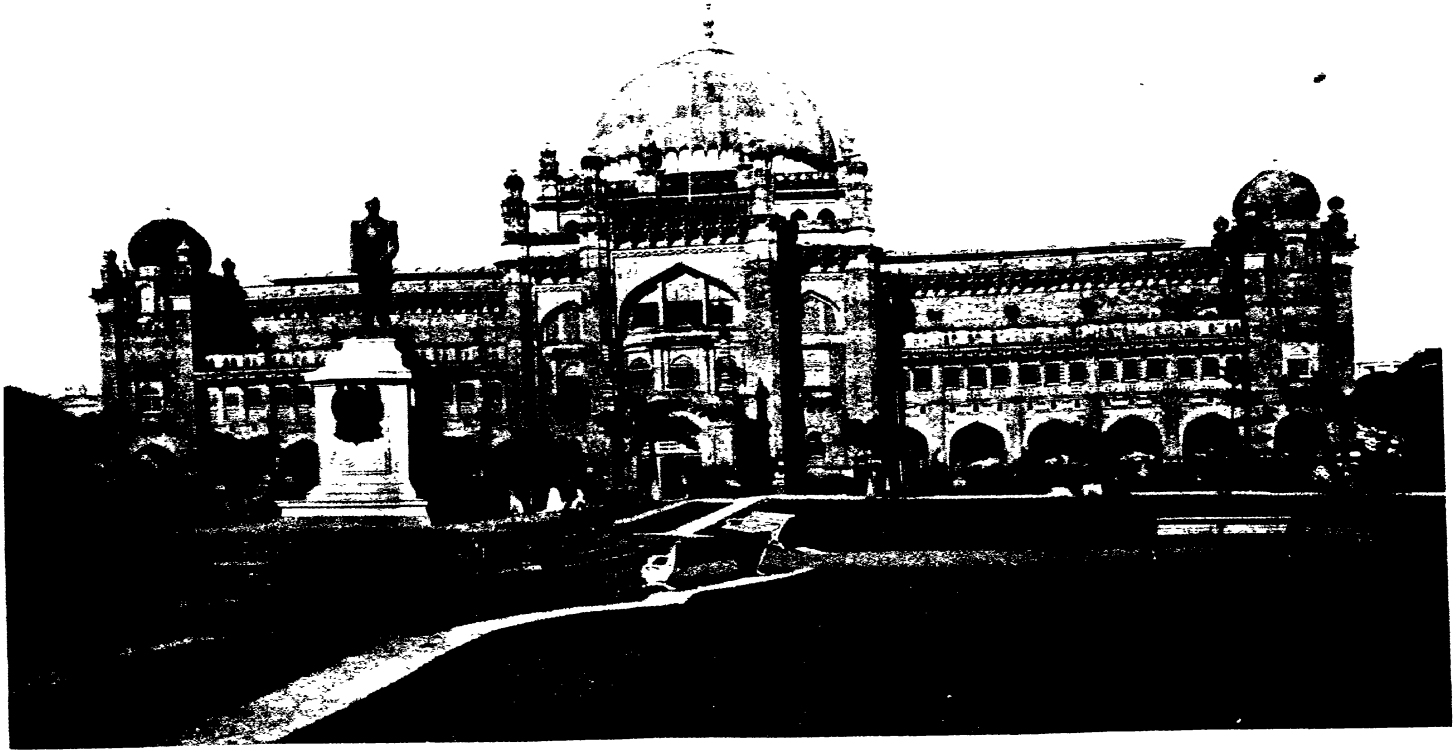


The Society's Museum at 6, Apollo Street, in 1921, previous to its transfer to the Prince of Wales' Museum.

THE GREAT INDIAN HORNBILL (*Dichoceros bicornis*).

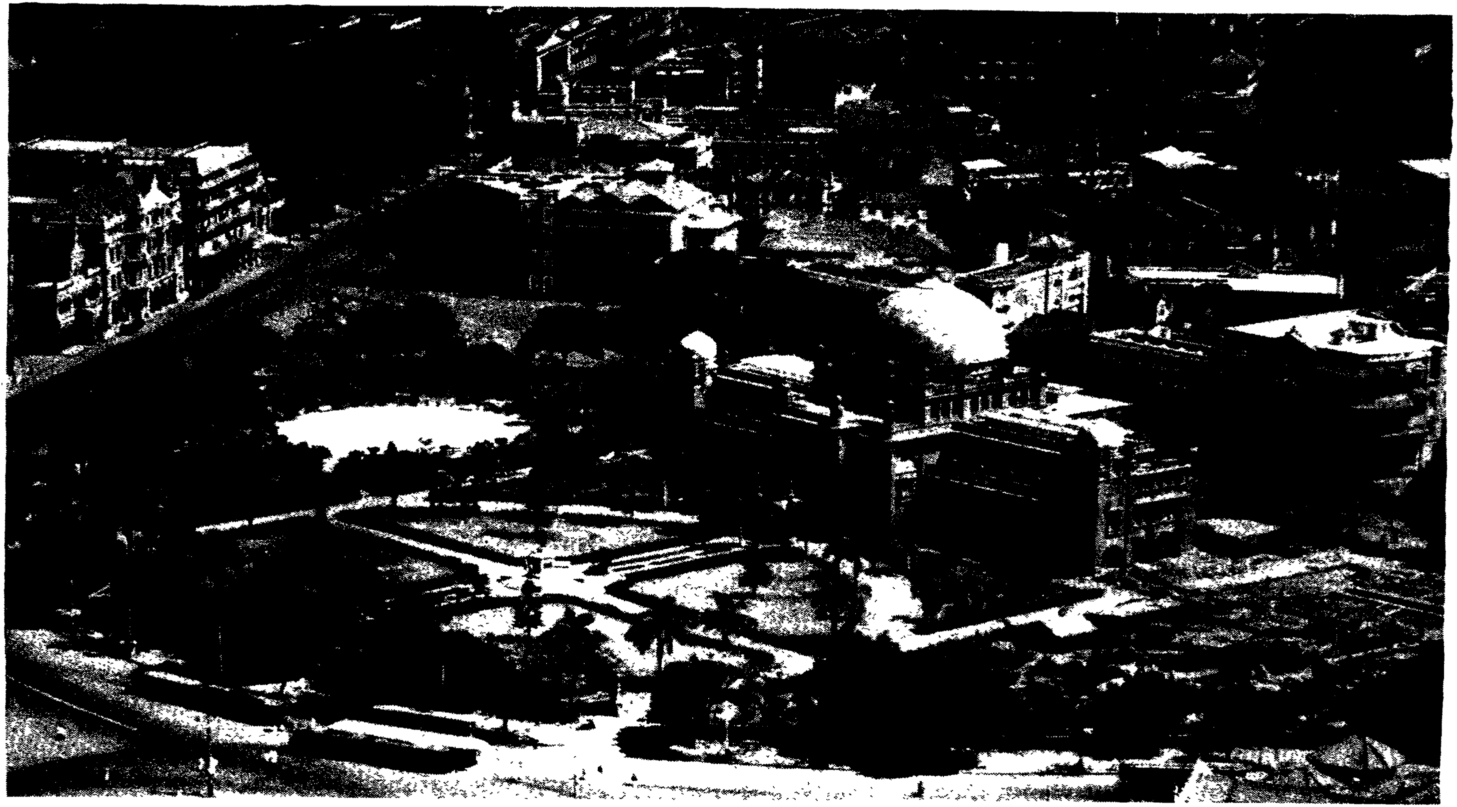
From a group in the Prince of Wales' Museum.

"William" the Great Indian Hornbill which lived for 26 years in the Society's rooms, plays the role of the male in this group which illustrates the curious nesting habits of these birds

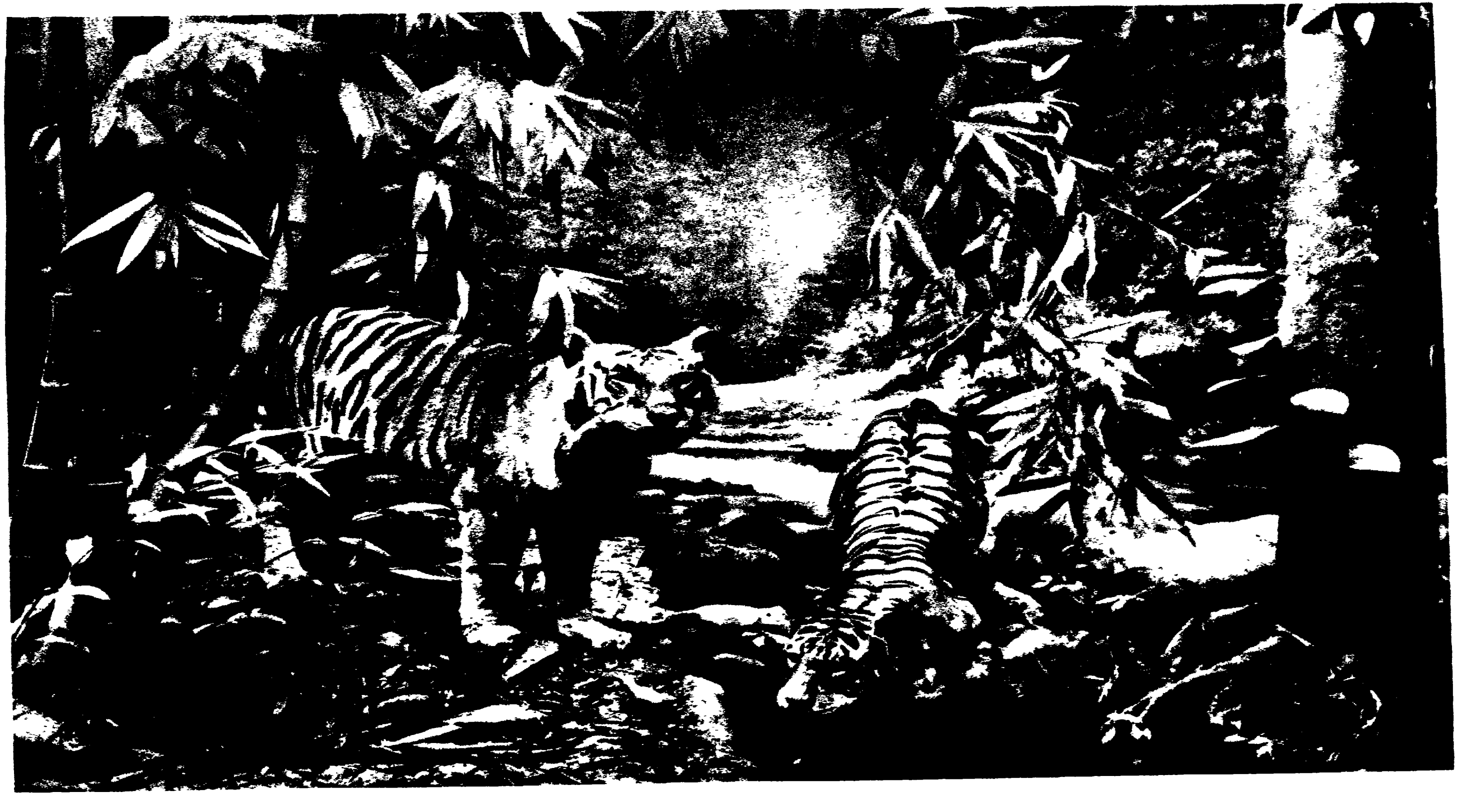


THE PRINCE OF WALES' MUSEUM, BOMBAY.

The collections of the Society were transferred to this building in 1921.

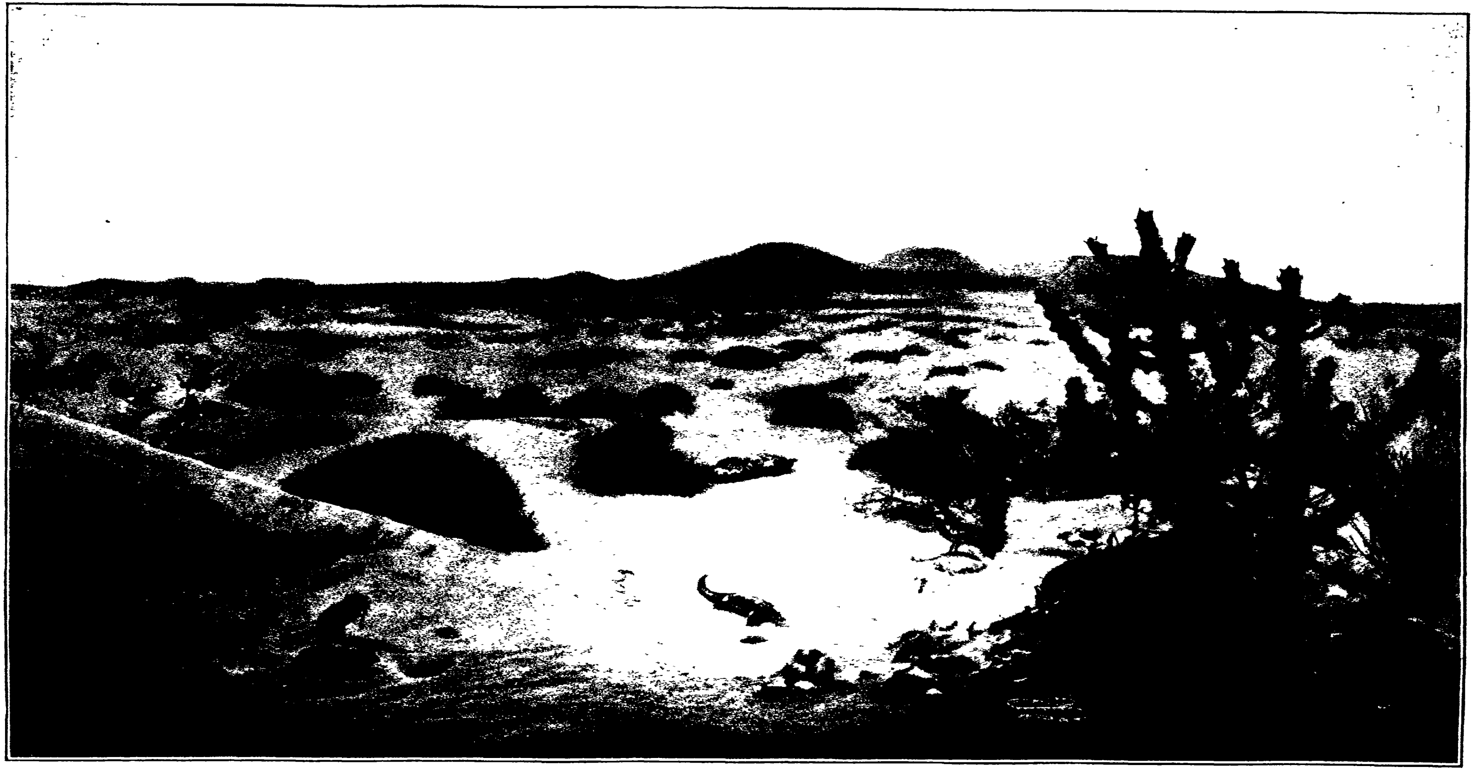


Aërial view of the Prince of Wales' Museum and Grounds.



TIGERS IN AN ASSAM JUNGLE.

A group in the Prince of Wales' Museum.



GROUP ILLUSTRATING ANIMAL AND PLANT LIFE OF THE INDIAN DESERT REGION.

One of the most effective groups in the Museum. It represents a portion of desert country in the Larkana District, Sind. The observer is looking across a waste of sand dunes and low scrub jungle to the distant Kirthar Range. The group shows the harmony which exists between the colouring of desert animals and their drab-toned surroundings. It is a phase of colouring characteristic of desert dwelling animals the world over.

Prince of Wales' Museum, Bombay.

Indian Mammalogy, when Brian Hodgson, Col. Sykes, Sir Walter Elliot, Col. Tickell, Horsefield, Blyth and Kelaart by their labours laid the foundations of Indian Mammalogy.

Among the earlier workers who contributed to the Society's Mammal collections was Col. A. E. Ward, the veteran sportsman and naturalist who collected for many years in Kashmir and who has contributed so much to the knowledge of the Fauna of that State. Major Dunn and Major Magrath collected in the Punjab, Capt. Whitehead mainly in Central India, E. B. Priestley of the Indian Police in Sind, and Col. F. E. W. Venning in Burma. In more recent years contributions were made by Col. R. W. Burton and Major C. H. Stockley.

As its members included many hunters of big game, the Society gradually acquired a fine collection of horns and heads. In 1885 it purchased a collection of heads from Mon. Dauvergne. In the same year a collection of skulls and horns was presented by Mr. J. Shillingford of Purneah. Among them were the skulls of an Indian Elephant and an Indian Rhinoceros and horns of Buffalo, Swamp Deer, Hog Deer and Spotted Deer. These two collections formed the nucleus of the Society's collection of heads of Indian Game Animals. Since then many members have presented their trophies. Mr. A. J. A. Jardine gave the Society a magnificent head of a Gaur (*Bibos gaurus*) in pursuit of which he had spent many a weary day to come finally upon the solitary giant after it had been pulled down by Wild Dogs. Other donors include Vet. Major G. P. Evans, whose book *Big Game Shooting in Upper Burma* is one of the best of its kind on the Game Animals of that Province, Mr. T. R. Bell, Col. C. W. Ravenshaw, Mr. T. J. Spooner, the late Mr. N. S. Symons and Capt. Irvine, and in more recent years Col. R. W. Burton and Col. C. H. Stockley.

The Society's Bird Collection, which now numbers several thousand specimens, has been built up almost entirely by the contributions of its members, many of whose names are now permanently associated with Indian Ornithology. Those who helped to form this magnificent collection in the early days were E. H. Aitken, Col. Swinhoe (Sind), H. S. Ferguson (Travancore), Curator of the Trivandrum Museum, whose work helped considerably the building up of what is known of the Zoology of the state, J. Davidson, who collected in Kanara, and Mr. Stuart Baker, the foremost Indian Ornithologist of our day, whose long and valued connection with the Society represents 42 years of devoted labour for the progress of Indian Ornithology. A contribution of particular value in recent years was the great collection of birds made by Major H. J. Walton in various parts of the Indian Empire. Space does not permit the mention of many other names associated with the forming of the bird collections. But a few that we must include are Col. F. M. Bailey who sent us many specimens from Sikkim and Tibet, Sir Percy Cox, High Commissioner of Mesopotamia, Mr. J. P. Cooke, Col. H. H. Harrington, Mr. S. L. Whymper and finally Mr. A. S. Vernay whose generosity made it possible for the Society to carry out the very important Ornithological Survey of the Eastern Ghats, a more complete account of which appears later.

The fine collection of Birds' eggs now in the Society's possession was formed largely by contributions made by Mr. Stuart Baker. Others who helped were Prof. Littledale, J. Davidson, Lt. H. Barnes, Mr. W. M. Gibbs, Sir Henry Macnaghten, Sir P. Z. Cox, Mr. F. A. Grant and Mr. F. Ludlow.

The Society's collection of Reptiles, which now numbers some eleven thousand specimens, was formed in the early days by the late Revd. Fr. Dreckman and Mr. Phipson. Others who helped to lay the foundation of this collection were Mr. Ferguson of Travancore, and Mr. W. F. Sinclair, one of the keenest members of the Society during its first years and the author of numerous articles dealing with the Natural History of the Konkan Coast. But the bulk of the collection is the work of Col. F. Wall, than whom no man has made a greater contribution to the existing knowledge of Indian Snakes.

The Society's Collection of Fishes was formed by Mr. H. M. Phipson who obtained the bulk of the specimens through frequent visits to the local fishing fleet at the fish bunders at Colaba. Himself a fisherman, Mr. Phipson presented and mounted some of the fish he caught in the local lakes. Carps taken by him at Poona in the early nineties are still on exhibition at the Prince of Wales' Museum. Other donors were Mr. E. Comber, for many years the moving spirit of the Western India Angling Association, Capt. Townsend of the Royal Indian Marine, who brought in many specimens taken during his trips up the Gulf and on the Arabian Coast, Mr. W. A. Wallinger and Mr. W. F. Sinclair.

As is the case with most amateur Societies, the collections are strongest in those fields of Natural History which make the widest appeal to amateur collectors. The Invertebrates are confined mainly to Insects and Molluscs. The splendid collection of Butterflies now possessed by the Society was formed by collectors in all parts of the Indian Empire. Among the earlier donors were Lionel de Niceville, author of the *Butterflies of India,* who collected in Mussoorie and the Western Himalayas, E. H. Aitken, J. Davidson and T. R. Bell (Kanara and Bombay), Capt. T. MacPherson (Malabar), H. Ferguson (Travancore), Major Yerbury (Punjab and Western India) and J. A. Betham (Central India). They were followed by other enthusiasts—Brigadier General Tytler (Assam and the Naga Hills), Captain (now Brigadier) W. H. Evans, whose books have done so much to popularise the study of Indian Butterflies, and who ranks today as one of the leading authorities on the subject. Philip Mackinon and de le Mesurier collected in the Western Himalayas. Col. F. M. Bailey sent the Society many rare and interesting specimens from Western China, South Eastern Tibet and the Mishmi Hills. Mr. W. Ormiston gave his magnificent collection of Ceylon Butterflies, a collection which formed the basis of his book on the Butterflies of Ceylon. Other donors were F. Hannyngton (U. P., Kumaon, and Coorg), Capt. G. Hare (Nilgiris), G. O. Drummond (Shan States) and Lt.-Col. H. D. Piele (Mesopotamia and Persia).

Among those who helped to form the collection of Molluscs were Mr. J. A. Abercrombie author of various papers on the Marine

Molluscs of the Bombay Coast, Mr. E. H. Aitken, Mr. W. Sinclair and Mr. T. R. Bell.

Living animals also found a place in the old rooms. Most famous of these was a great Indian Hornbill named 'William' which, taken as a nestling in 1894 lived in the Society's rooms till May 1920. William was quite a character and is so intimately associated in the minds of the many who knew him with the Society and its museum that he is fittingly honoured with a special coloured plate in this issue. The picture is of a case in the Bird Gallery in the Prince of Wales' Museum which shows the curious, nesting habits of the Great Indian Hornbill. 'William' is here given the rôle of pater-familias—a privilege he did not in life enjoy, and is seen feeding his imprisoned spouse through the narrow slit in the wall which the birds build to close the entrance to the nest hole.

William apparently was very happy during the 26 years he lived in his large cage. He made a great fuss of his personal appearance, and painted his great casque and beak with bright yellow from his 'Vanity-box' (the oil gland at the root of his tail) and he finished this daily ritual off with a dash of colour carefully placed on each wing. He was then ready to play a game with you. He would catch easily a tennis ball thrown from a distance of 7 or 8 yards. The long curved beak prevented him from ever drinking anything, but he got all he wanted from the juice of ripe berries and fruit, and this in no way affected his cheery disposition. Cockroaches were to his liking, and a mouse, a snake or even a large rat he dearly loved, but it was not easy for him to get these as he was hardly ever on the ground. One rat he held in his pickaxe beak for more than an hour before finally crunching it up. If he had not overeaten himself on a bit of wire he would probably be alive to this day. Others have succeeded him but the 'Office Canary', as he was affectionately called, is greatly missed.

Live Snakes—as was but natural—were well in evidence. In one cage was a 15 feet Malay Python, and in another a 12 feet Indian Python. The latter previously had a companion, a little longer than himself, but after a struggle as to who was to swallow a black partridge—the winner swallowed not only the partridge but the other snake plus a red blanket ! and so there was one ! The Malay Python would not feed naturally and at times had to be pulled out of the cage and held by four men whilst Mr. Phipson rammed bullocks' tongues down its throat.

The poisonous snakes were always a source of mingled interest and alarm particularly a King Cobra.

The story of how we obtained that King Cobra may be of interest as it was one of the last contributions we received from E. H. Aitken.

EHA wrote from Kanara to say that one evening one of his subordinates in the Salt Department came to his bungalow with a snake trailing over his shoulder and told EHA 'I saw two big snakes fighting in the jungle—I smashed at them with a stick—one got away, but I killed this one and have brought it to you—What is it?' 'It is a King Cobra, and you have not killed it,' replied EHA. The much belaboured snake was put in a crate and sent by sea to the Society. 'It may not survive the journey' wrote EHA. 'If it does not you will know it by the smell. If there be no smell be careful'. There was no smell—we were careful and the King Cobra lived with us for two years serving the cause of science by permitting—with a good deal of suasion—the snake men from the Parel Laboratory to remove his poison about once a month.

An idea of the old museum at 6, Apollo Street, as it appeared in the early days, will be obtained from the photographs published. They show the beginnings of the museum and its growth and development up to the period when the bulk of the collections were transferred to the Prince of Wales' Museum, Bombay. There was about the old rooms nothing of that frigidity and gloom which one somehow associates with museums. A spirit of friendliness prevailed; and a welcome there was for all who came in to look over the collections. The old 'Visitors' Book' contains many distinguished names. Among them is His Majesty the King of Roumania, now a Life Member of the Society, the King of Siam, the Crown Prince of Belgium, the late Franz Ferdinand, Archduke of Austria, a Life Member, whose tragic death at Serajevo signalled the outbreak of the Great War. Statesmen are represented by the late Mons. Clemenceau, and the late Sir Samuel Montagu who came in with the then Viceroy, Lord Chelmsford, and, to the horror of the staff, chose New Year's day for his visit. Among men of letters there were Rudyard Kipling, and Mark Twain who during one of his 'tramps abroad' strolled across from his rooms at Watson's Hotel and on leaving emblazoned the name 'Clements' across the page of the visitors' book with the wrong end of the pen. Though the space prevented any elaborate display of the collections in the rooms at 6, Apollo Street, the little museum was in its day one of the attractions of the city. It exerted an influence, and carried out a work which reached far beyond its walls and which has left its indelible impression on the annals of scientific progress in India. All honour to those men who in the past have laboured in its building. But we must get away from the old museum to the new. The greater part of the Society's collections were transferred to the Prince of Wales' Museum in September, 1921.

The Prince of Wales' Museum, Bombay

In a Report of the Prince of Wales' Museum of Western India, (Natural History Section) published in 1928, it is recorded:

'The necessity for finding suitable accommodation for its rapidly expanding collection, and the material assistance the Society, as then organized, would be able to render in the founding of a properly conducted Natural History Museum in Bombay was early foreseen by Mr. Phipson. An opportunity for expressing his views on a subject so near to his heart was afforded him when, in the year 1904, he was elected to serve on a committee appointed by a Government Resolution No. 2414, dated 12th May 1904, to consider the question of a public Museum and Library for Bombay. At the third meeting of the Museum Committee, Mr. Phipson proposed that the public Museum should take the form of three separate buildings, one for Art and Archaeology, the second for a Public Library, and the third for a Natural Science Museum. The three buildings in question to be grouped on the Crescent site (the present location of the Museum) for architectural effect, but otherwise to be kept distinct. Mr. Phipson's proposals were approved by the Museum Committee which submitted its report to Government in May 1904. In the following year, at a public meeting of the citizens of Bombay held on the 15th August 1905, it was resolved that the permanent memorial to commemorate the visit of Their Royal Highnesses the Prince and Princess of Wales to this City and Presidency should take the form of a public Museum and Library.

The actual question of the transfer of the Society's collection to the new museum was first proposed at a meeting of the Managing Committee of the Society held on the 18th September 1906, when Mr. W. S. Millard, who had succeeded Mr. Phipson as Honorary Secretary, was instructed to approach Government to the effect that the Committee of the Society would be prepared to recommend the transfer of the Society's collection to the new museum on certain conditions laid down by the Committee. Consideration of these proposals by the Trustees of the Museum were postponed till the completion of the building when a further delay was occasioned by the outbreak of the Great War and the handing over of the building to the military authorities for use as a hospital. The question was not raised again till 1918, when Mr. W. S. Millard again addressed the Trustees on the subject of the transfer of the Society's collection to the new museum.

The proposals put forward by the Society were accepted by the Trustees as a basis for further negotiation, and represented by them to Government. Government were however of opinion that the Society's terms could not be accepted without an amendment of the Museum Act. Negotiations were resumed in the following year by Mr. (now Sir) Reginald Spence, who had succeeded Mr. Millard as Honorary Secretary.

An amended draft approved by the Committee and members of the Society was placed before the Trustees of the Museum, and before Government, embodying the revised terms under which the Society would be willing to place its collections in the Prince of Wales Museum.

These proposals were approved of by the Trustees and received the formal assent of Government at a meeting held at the Secretariat on the 21st January 1921.

There were a good many misgivings as to the desirability of the move. Perhaps the first who 'doubted' was one of our original members Col. H. D. Olivier, R. E., Agent of the B. B. & C. I. Railway whose brother Lord Olivier subsequently became Secretary of State for India. In a characteristic letter in July 1904 he wrote:

'The whole of Europe is dotted over with attempts at

Museums full of badly stuffed birds and beasts, and quite useless as a source of pleasure or instruction.

'The Bombay Natural History Society is a brilliant exception in the shape of a small unendowed Museum; but it owes its success entirely to private enthusiasm more especially to the genius of the Honorary Secretary (H.M.P.). I should be extremely sorry to see it transplanted into the Nirvana of a Public Building, where there would be no one to look after it and where it would speedily become on the same level as most of such institutions.

Of course if Government will endow the Natural History Museum sufficiently it will be a very different matter. But I should most strongly urge getting the endowment before we put our money into a building.'

Mr. Millard, who succeeded Mr. Phipson, was cautious and was not disposed to hand over the Society's collections and the experienced craftmanship of the Society's staff until he was assured of adequate provision for its maintenance. The terms, finally negotiated, are in the opinion of the Society and the Museum Trustees fair to both sides.

The collections of the Society, now displayed in the galleries of the Museum include mainly such material as is specially prepared and made suitable for public exhibition. The greater part of the research collections which are not open to the general public, continue to be kept in the old rooms at 6, Apollo Street which still remain the Society's offices.

In the galleries of the Museum which are intended mainly for the benefit of the people a special effort has been made to make the exhibits as attractive as possible. This ideal is expressed in many of the beautiful groups showing animal life in its natural environment. Photographs of some of the exhibits are published here. They give some idea of the great progress that has been made in recent years in methods of Museum technique of which the Society has taken due advantage. The section is popular with all classes of visitors who average about 2,000 a day.

Mention must here be made of the generous donations received from various members of the Society who are now its Vice-Patrons. Since 1923, a sum of Rs. 35,000 has been received in donations from members for the equipment of show cases and preparation of exhibits in the Natural History Section galleries. Prominent among these is Mr. F. V. Evans, to whom the Museum owes the fine series of exhibits illustrating the Marine Fishes of Bombay. Mr. A. S. Vernay has also been one of our most generous benefactors. Incidentally it might be mentioned that his generosity has helped the publication of this commemorative Volume. Other Vice-Patrons whose names we should record are H. H. the Maharao of Cutch (Vice-President of the Executive Committee); H. H. the Maharaja of Jodhpur; H. H. the Maharaja of Rewa; H. H. the Maharaja of Bhavnagar; H. H. the Maharaja of Travancore, and Sir David Ezra.

An insufficient provision of space in the present Museum building, however, proved an obstacle to the development of the Natural History Section from its very inception. Twelve years

BIRDS IN RELATION TO PLANT LIFE.

The beautiful scarlet flowers of the Silk Cotton Tree (*Bombax malabaricum*) which blooms during the cold weather are fertilised mainly by birds which flock to feed on the nectar or the insects which are attracted by it. Very many species of birds visit the tree, prominent among these are the Rosy Pastors and Mynahs shown in the group.

Prince of Wales' Museum, Bombay.

THE NIGHT HERON (*NYCTICORAX NYCTICORAX*).

The group shows the parent birds, a pair of nestlings in down and, in the background, a young bird in the streaked juvenile plumage so different from the trim grey and white of the adult birds. Night Herons usually nest in large colonies on trees of considerable size. They are truly nocturnal in habit.

Prince of Wales' Museum, Bombay.

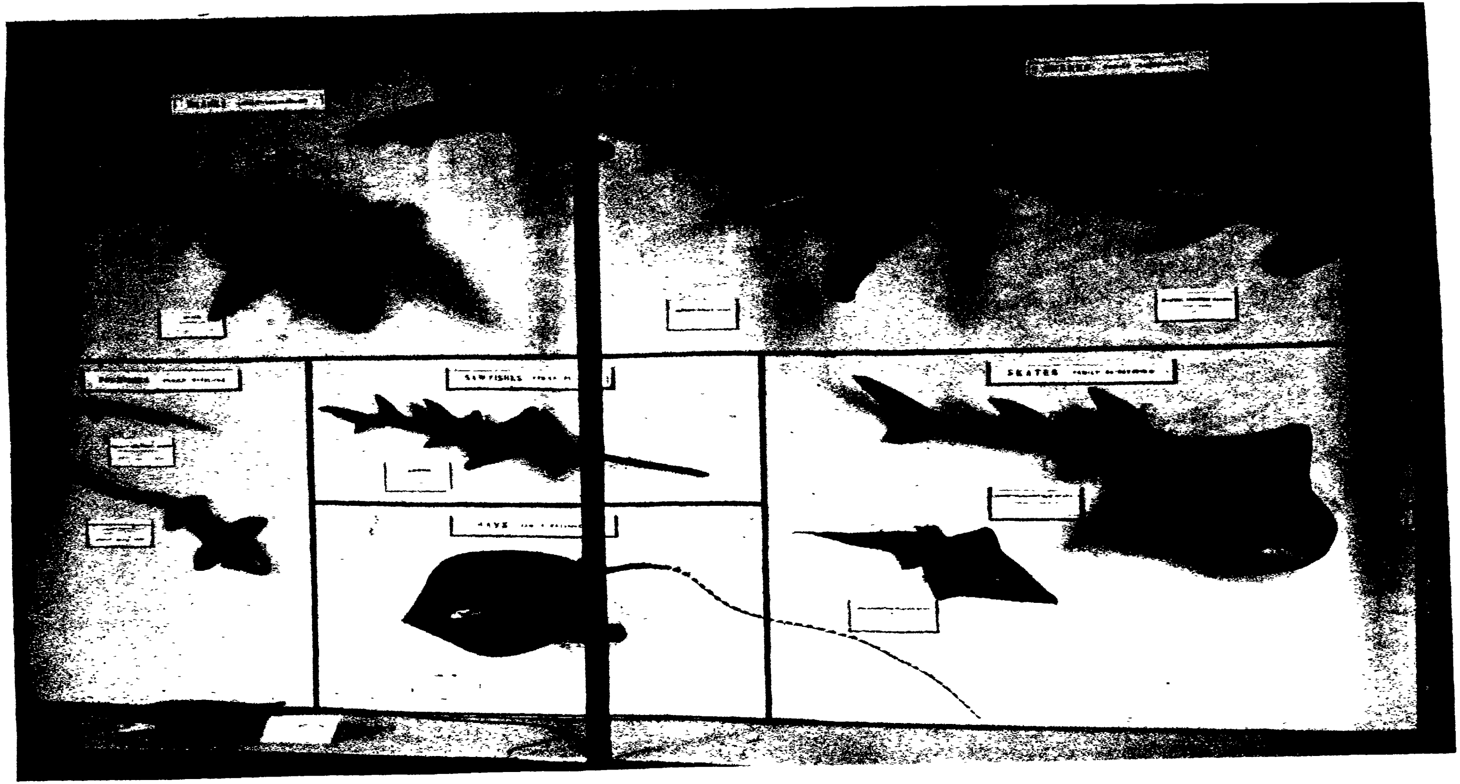
SEA SNAKES.

A submarine group illustrating Blue-banded Sea-Snakes. *(Hydrophis cyanocincta)* in a coral reef
Prince of Wales' Museum, Bombay.

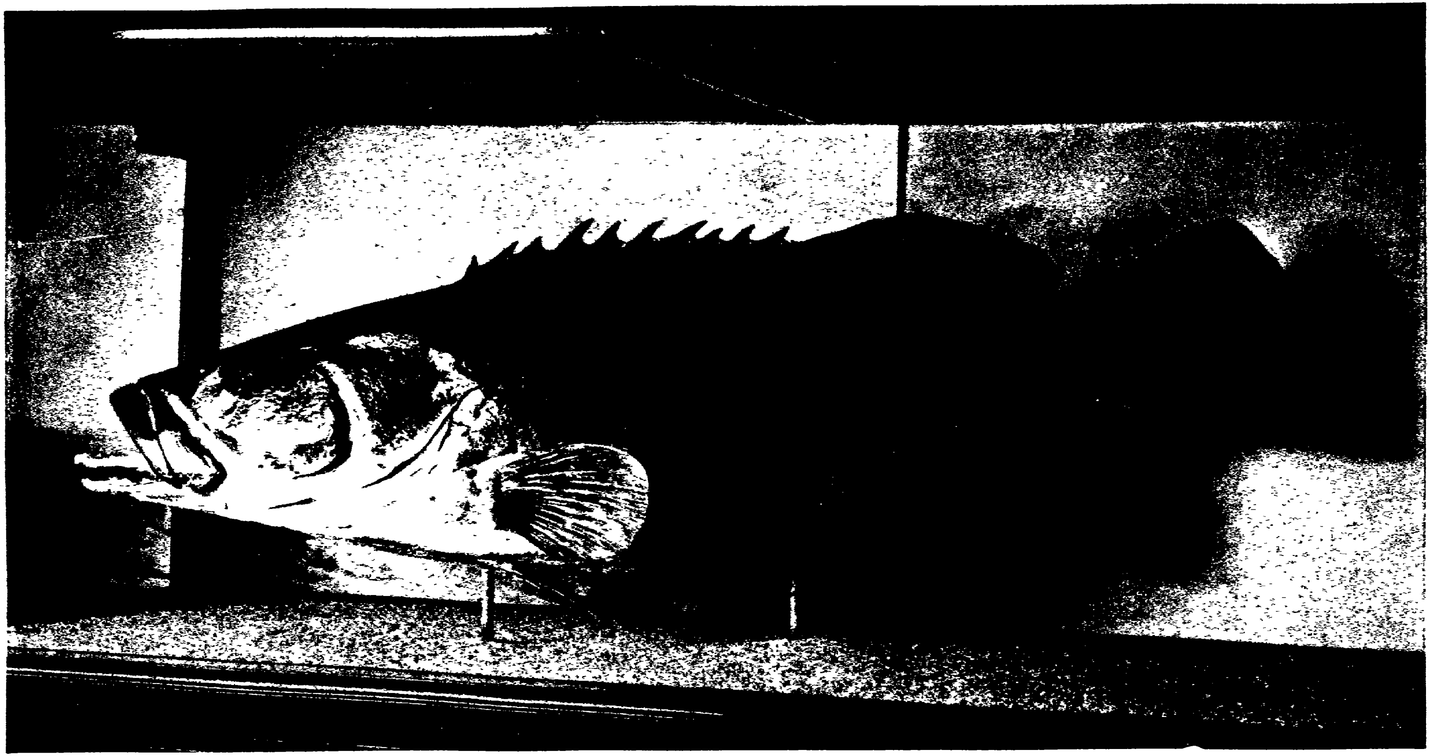
THE CHECKERED WATER-SNAKE (*TROPIDONOTUS PISCATOR*).

A common snake throughout India living in tanks, ponds and rivers.

Prince of Wales' Museum, Bombay.



SHARKS, SKATES AND RAYS.
Part of the Evans' Collection of Marine Fishes.
Prince of Wales' Museum, Bombay.



THE LEOPARD PERCH (*SERRANUS PANTHERINUS*).

A giant specimen of the Leopard Perch, measuring 7 feet in length and weighing 475 lbs. It was caught in Bombay Harbour on a 6" hook and night-line, baited with dead fish.

Prince of Wales' Museum, Bombay

of continuous development have brought about a condition where the continued progress of the Museum depends mainly on the provision of more accommodation for the rapidly growing collections.

The Trustees of the Museum have now decided to build a new wing. Its foundation-stone was laid by H. E. Sir Frederic Sykes, Governor of Bombay, on October 1933; a fitting event to mark the Jubilee year of the Society. Funds are not sufficient at present to complete the entire wing, but it is proposed to erect a part of the building of which the Natural History Section will occupy the entire ground floor. The additional space will give the Natural History Museum scope for development for a further period by which time the money may be available to complete the entire wing as designed.

CURATORS—PAST AND PRESENT

The Natural History Section of the Prince of Wales' Museum in its arrangement owes everything to the present Curator—Mr. S. H. Prater. This may, therefore, be a good place to discourse on Curators.

The first Curator to be remembered was a tall man named J. M. Mason, brought by EHA from the Scottish Orphanage to be trained. He was not much of a success; though at times he had flashes of genius, as when he realised that a snake's water tin would not allow baby crocodiles to develop to maturity, and deposited (secretly) one of a batch of hatchlings in the old Gowalia Tank. There was no doubt about it—the Gowalia Tank was the proper place for young crocodiles to thrive in—and one day a 3 or 4 ft. crocodile thoroughly frightened a poor woman washing in the tank. The answer to the question 'who was responsible' has now for the first time been disclosed.

The next Curator of note (it is not certain that he actually succeeded Mason) was Mr. A. Cabral. His promising career was cut short as the result of a bite from a poisonous snake.

He was followed by Mr. J. Clinton Bond, now Curator of the McMahon Museum at Quetta.

The Society had so developed that the need was apparent for a thoroughly trained and experienced Curator who would bring to India new ideas and would train up the staff necessary to cope with the scientific work which the Society was doing. As usual finance had been the stumbling block which had prevented our obtaining the services of a highly trained professional man, but in July 1907 the Government of Bombay promised the Society an annual grant of Rs. 5,000 provided they undertook to engage the services of a qualified Curator.

The money having been provided the finding of the right man was not difficult, and Mr. Norman B. Kinnear accepted the Society's offer of a five years' engagement and joined us on the 1st November 1907. His appointment was indeed a case of 'From Greenland's icy mountains to India's coral strands' as when Mr. Millard first got into touch with Mr. Kinnear the latter was on a whaler between Iceland and the coast of Greenland making investigations into the deep sea fauna for the Scottish Museum. Mr. Kinnear had been trained in the Royal Scottish Museum at Edinburgh under Mr. Eagle Clark and before he came to Bombay spent some weeks with Mr. R. C. Wroughton at the British Museum (Natural History), South Kensington.

During his term of office, Mr. Kinnear gave invaluable service to the Society by placing its whole museum on a proper scientific basis, through the rearrangement, labelling and cataloguing of the collections. He was able to provide more effective assistance to members who sought the Society's help, and generally to guide the work of the Society in directions which produced greater scientific gain. To his building we owe the present progress and development of the museum on sound lines.

When Mr. Kinnear left us for the British Museum, Mr. R. C. Wroughton sent out to us as Curator—Mr. B. C. Ellison, a young man who had been interned in Germany at the outbreak of the war—contracted typhus, and gone through the horrors of a German Typhus Camp.

On the arrival of H. R. H. the Prince of Wales—Mr. B. C. Ellison was attached to his staff as Naturalist.

Typhus had undermined Mr. Ellison's health and he suffered continually from Malaria, so much so that in 1923 the Society's medical advisers decided against his remaining longer in the country and he retired from service.

Mr. S. H. Prater, the present Curator, entered the Society's service in March 1907. He worked first under Mr. Comber's guidance and subsequently as an assistant to Mr. Kinnear. Mr. Kinnear and Father Blatter, between them, contributed towards his training. Together they laid the foundation on which our present Curator so well built, when the opportunity was given to him later to study Museum work and technique in England, on the Continent and in the United States.

In 1923 the Committee appointed Mr. S. H. Prater, Curator and he had as Assistant Curator, Mr. C. McCann, another disciple of Father Blatter—this time of a botanical turn of mind, as his work with Father Blatter on the revision of the Flora of the Bombay Presidency shows. He is however versatile, and Mammals, Batrachians etc. all engage his attention.

The work of the Museum increasing, a second Assistant Curator was engaged in the person of Mr. V. S. LaPersonne—another local product—this time from the Bombay Education Society's School. Sir Percy Cox, who first gave LaPersonne an opportunity of showing his abilities as a collector, later employed him during the hot weather in the Marshes of the Hamma Lake where the Euphrates joins the Tigris. The Marsh Arabs have an unenviable reputation but, like so many uncivilized people, respect the mad. A Sahib who collected birds in their Marshes in the middle of a Mesopotamian hot weather must be mad they declared; and Mr. LaPersonne was left unmolested, and has since carried out many other expeditions with credit to the Society if not with pleasure to himself.

Mr. Prater soon realized that if the Natural History Section of the Prince of Wales' Museum was to be worthy of the Society, the arrangement and display of the exhibits must be on lines different from those usual in India. He also realised that the Society could not afford to send specimens to Europe or America to be turned into mounted Museum Exhibits. Some one must go to England and learn. The Committee decided to send their Curator and he spent several months in 1922 in the Taxidermy rooms of Mr. L. C. Harwood at Hammersmith, and later made a study tour of the more important museums in England and in Edinburgh.

So pleased were the Committee with the result of his visit that in 1926, in co-operation with the Trustees of the Museum Mr. Prater was sent on a second deputation this time to the United States. He studied modern museum methods at the Natural History Museum, New York, and subsequently spent some time in the Field Museum at Chicago and at other large museums in the States.

While at the New York Museum, Mr. Prater was able to study the technique employed in the preparation of the magnificent groups which now adorn the hall of Asiatic Mammals. The groups show most of the great game animals of India in their natural surroundings—each a perfect reproduction of the animal in its environment. On his way back to India Mr. Prater visited the Berlin Museum and various Institutions in Hamburg, Munich, Paris, Brussels and Vienna.

The results of his study are seen today in the fine series of groups and exhibits and the attractive methods of their display in the galleries of the Prince of Wales' Museum.

must be made of the many field naturalists who have contributed notes and observations to the Journal. Prominent among them are J. D. Inverarity, Reginald Gilbert, Major G. H. Evans, author of *Big Game Shooting in Burma,* Dunbar Brander, author of the *Wild Animals of Central India,* one of the best books of its kind published in recent years, Prof. H. Littledale, A. M. Markhan (Rohilla), R. A. Sterndale, author of the *Mammals of India,* J. H. Steel, Major G. S. Rodon, Brig. Genl. R. G. Burton and his brother Col. R. W. Burton, A. P. Kinloch, Col. F. M. Bailey, Stuart Baker, Col. C. H. Stockley, R. C. Morris and others. Their observations have added very considerably to what was known of the Natural History of Indian Mammals.

Birds.

Papers relative to the Avifauna of the Indian Empire have formed an important feature of the Society's Journal. It is the recognised and most suitable channel for their publication. No branch of zoology in India has enlisted so much attention or attracted so many observers as Ornithology. The Society's Journal contains a large portion of the papers on Indian Birds issued in the interim between the publication of the first volume of Birds by Oates in the Fauna of British India in 1889 and the second edition of the Fauna, by Stuart Baker, completed in 1930. Oates himself contributed several papers to the early numbers of the Journal. Other notable contributors of the time were Davidson, Butler, Stuart Baker and H. H. Harrington.

We are now entering upon a fresh period of ornithological work in India—that subsequent to the publication of the new Fauna. As in the case of the first edition the new Fauna provides a nucleus upon which present day and future workers may build. The advances made in Indian Ornithology since the general acceptance of the Trinomial system and the progress achieved since the publication of the Fauna is evidenced in the more recent volumes of the Journal which contain revisions of various genera and species, descriptions of new races since discovered and their geographical distribution. The papers are based mainly on collections obtained through Ornithological Surveys carried out by the Society of which a more detailed account appears later.

Ornithologists principally concerned in this work are Messrs. Whistler and Kinnear to whom was entrusted the working out of the collections obtained by the Society in the Eastern Ghats and South India, and Dr. Claude Ticehurst who reported on the collections made by Mr. Stanford and Mr. Villar in Burma.

An important feature of the Ornithological contributions in the Society's Journal is the numerous faunistic lists recording the bird life of various towns, districts, provinces or areas in the Indian Empire and the countries which adjoin it. They are the work of numerous observers whose labours have accumulated important data relative to the distribution and variation of species. We give below an account of those principally engaged in this work and the areas they worked in.

E. C. STUART BAKER.

Western Himalayas

1. *Kashmir—*

Kashmir, Jammu and the adjacent Districts, 1903-05 (Vols. XVII, pp. 108, 479, 723, 943 and XVIII, 641).	Col. A. E. Ward
Vale of Kashmir, Pirpinjal Mts., the Sind, Liddar, Suru and Dras Valleys, Haramukh Mts., Nukun and the headwaters of the Wardwan Valley, Notes on the Birds of Kashmir, 1922-1925 (Vols. XXXI, 975 and XXXII, 132).	B. B. Osmaston
Gulmarg, June-September, 1922 (Vol. XXIX, 493).	"
Srinagar, Winter, 1920 (Vol. XXX, 473).	"
Srinagar, April-May, 1920 (Vol. XXVIII, 990).	H. Whistler
Srinagar do (Vol. XXX, 471).	L. S. White
Liddar and Sind Valleys, Bird notes by the way in Kashmir, 1911 (Vol. XXI, 545) and June-July, 1914 (Vol. XXVIII, 276).	H. A. F. Magrath
Chitral, Oct. 1901-Oct. 1902 (Vol. XVI, 44).	H. Fulton
Chitral, Oct. 1902-Oct. 1903 (Vol. XIX, 1901).	G. A. Perreau
Chitral (Vol. XXI, 614).	F. Wall
Sind and Jhelum Valleys, Nesting, July-August (Vol. XII, 634).	N. F. T. Wilson
Astor, Nesting, April-August, 1902 (Vol. XV, 131).	K. Buchanan
Sind and Liddar Valleys, Birds nesting with a camera (Vol. XXIX, 947).	R. S. P. Bates
Dhal Lake, Nesting (Vols. XXX, 600 and XXXIII, 656).	"
Wular Lake (Vol. XXX, 97, 793).	"
Morari Lake, Rupshu, Ladak, Nesting, spring and summer, 1919 (Vol. XXVII, 141).	F. Ludlow

2. *Punjab Hill Stations—*

Simla and the adjoining Hill States, 1908-1918 (Vol. XXVI, 601).	A. E. Jones
Simla, Fagoo, 1918 (Vol. XXVI, 770); 1919 (Vol. XXVII, 94); Feb.-Oct., 1925 (Vol. XXXII, 726).	H. Whistler
Simla (Vol. XXXI, 224).	S. Basil Edwards
Kulu, Kangra Dist., 1910-1926 (Vol. XXXI, 458).	H. Whisfler
Dalhousie, June, 1915 (Vol. XXIV, 582).	"
Dharamsala, Feb.-Oct., 1925 (Vol. XXVII, 555).	R. W. Hingston

Murree and the Gallis, Birds nesting, 1903-1904 (Vol. XVI, 421, 657).	R. H. Rattray
Murree and the Gallis, Birds nesting, 1908 (Vol. XIX, 142).	H. A. F. Magrath

3. *Garhwal and Kumaon—*

Naini Tal (Vol. XXXIV, 821).	C. Hudson
British Garhwal, Nesting, 1910-1920 (Vol. XXVIII, 140).	A. E. Osmaston
Garhwal, Nesting, June, 1909 (Vol. XIX, 990).	S. L. Whymper
Nila Valley, Nesting (Vol. XX, 1157).	,,
Tons Valley, Nesting, June, 1896, 1897 (Vols. XI, 64, 468 and XXV, 493, 1917).	B. B. Osmaston
Belhaung Valley, Nesting, April-May, 1926 (Vol. XXXI, 817).	E. E. Searight
,, ,, June-July, 1927 (Vol. XXV, 495).	W. H. Mathews

TIBET

Gyantse, Chumbi Valley and S. E. Tibet 1906-1909 (Vol. XXI, 178).	F. M. Bailey

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Sikhim Himalayas (Vols. XXIX, 503, 723, 1007 and XXX, 53, 352, 664, 872).	H. S. Stevens
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North Cachar (Vols. VIII-XIII, 12 parts).	E. C. Stuart Baker
,, Bulbuls of (Vols. VII, 1, 125, 263, 413 and VIII, I).	,,
North Cachar, Hylakandy Dist. (Vols. X-XIII, 8 parts).	C. M. Inglis
Khasi Hills (Vol. XVII, 783, 957).	E. C. Stuart Baker

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Chindwin, Upper and Lower Dists., Nov.-May, 1902-1906 (Vol. XVIII, 78).	E. Oates & A. Mears
,, (Vol. XVIII, 432, 494).	J. C. Hopwood
,, (Vol. XXI, 1089, 1912).	,,
,, (Vol. XVI, 166).	H. H. Harington
Chin Hills, Upper Forest Div., April-May 1913-1915 (Vol. XXV, 72).	J. C. Hopwood and J. M. D. Mackenzie
,, Haka (Vol. XXI, 621).	F. E. W. Venning
Chin, Kachin and Shan Hills (Vols. XXXIII, 800 and XXXIV, 46, 337).	P. F. Wickham
Bhamo District (Vols. XIX, 107 and XX, 373).	H. H. Harington
Taungyi, S. Shan States (Vol. XIV, 596).	,,
Ruby Mines District (Vol. X, 108).	E. Oates

Myingyan District (Vol. XVII, 184, 492).	K. C. Macdonald
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Thandoung, Tounghoo Dist. (Vol. XXI, 668).	J. P. Cook
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Rangoon (Vol. XIX, 358).	H. H. Harington
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,, Birds nesting, 1905 (Vol. XVI, 747) and 1906 (Vol. XVII, 828).	R. M. Betham
,, Notes on birds near, 1902 (Vols. XIV, 601, and XV, 351).	T. E. Marshall
,, Birds nesting at, 1914 (Vol. XXIII, 362).	R. Meinertzhagen
Baluchistan, List of birds of, 1915 (Vol. XXIII, 745) and 1916 (Vol. XXIV, 156).	H. Delme Radcliffe
,, Birds of British, 1926-1927 (Vols. XXXI, 687, 862 and XXXII, 344).	C. B. Ticehurst
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NORTH-WEST FRONTIER PROVINCES

North West India, Notes on Some Birds, 1905 (Vol. XVII, 243) and 1907 (Vol. XVIII, 191).	C. H. T. Whitehead
Kohat and the Kurram Valley, Birds of, 1910 (Vol. XX, 169, 776, 954) and 1916 (Vol. XXIV, 601).	,,
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Bannu, Notes on Birds, 1908 (Vol. XVIII, 684).	
Kaghan Valley, Hazara Dist., Birds of, 1914 (Vol. XXIII, 104).	C. H. T. Whitehead
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GANGETIC PLAIN

Plains of the Punjab, Rajputana, U. P., Bengal, Behar and Orissa.

1. *Punjab.*

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,, (Vol. XXI, 1073).	A. E. Jones
Gurdaspur District, Birds of, 1914 (Vol. XXIV, 601).	A. J. Currie
Ludhiana Dist., Birds of, June-Oct., 1917 (Vol. XXVI, 585).	H. Whistler
Hissar Dist., Birds of, 1914-1915 (Vol. XXIV, 190).	,,
Gujranwala Dist., Birds of, March-Oct., 1915 (Vol. XXIV, 689).	,,
Rawalpindi, Winter migrants (Vol. XXI, 262).	,,
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Ferozepore, Birds nesting round, 1916 (Vol. XXIV, 829).	R. M. Betham
Delhi, Winter, 1924-1925 (Vol. XXXI, 261).	S. Basil Edwardes

2. *United Provinces—*

Plains of the U. P., Nest and Eggs of Common Birds of (Vols. XXVIII, 1069, and XXIX, 107, 334, 757, 963).	E. H. N. Gill
Gonda Dist., Birds breeding in, 1922 (Vol. XXVIII, 753).	F. Field
Gorakhpur Dist., Birds of, 1913 (Vol. XXII, 532).	A. E. Osmaston

3. *Bengal—*

Jalpaiguri Dist., Vertebrate fauna of, 1920 (Vols. XXVI, 988 and XXVII, 151).	C. M. Inglis and others.
Madhubani, Dharbangha Dist. (Vols. XIII, 621; XIV, 132, 362, 554, 764 and XV, 70, 337—7 parts).	,,

INDIAN PENINSULAR REGION

1. *Rajputana & Central India—*

Central India, Birds from (Vol. IX, 185).	W. T. Blanford
Neemuch, Rajputana, Birds nesting in, 1886 (Vol. I, 38).	H. E. Barnes

Mhow, Birds nesting near, 1905 (Vol. XVI, 514).	M. Young
,, Birds nesting, 1909 (Vol. XIX, 988).	R. M. Betham
Seehore, Birds of, 1911 (Vol. XXI, 153).	W. C. T. Whitehead
Mhow, Birds in neighbourhood of, 1931 (Vol. XXXV, 382).	W. F. Briggs

2. *Central Provinces—*

Saugor and Damoh, Resident birds of, 1911 (Vol. XXI, 87).	R. C. H. Moss King
Balaghat, Collecting and List of Birds of, 1912 (Vol. XXI, 1158).	E. A. D'Abreau
Pachmari, Birds of, 1922 (Vol. XXVIII, 453).	B. B. Osmaston

3. *Bombay Presidency—*

Western India, Nesting in, 1888-1891 (Vols. III-VI, 8 parts).	H. E. Barnes
Western Ghats and Kanara, Birds of, 1898-1899 (Vols. XI, 652 and XII, 43).	J. Davidson
Kharaghora, Birds breeding at, 1892 (Vol. VII, 544) and 1893 (Vol. VIII, 325).	H. Bulkley
Poona, Birds nesting, 1899 (Vols. XII, 778; and XIII, 380, 686) and 1900-1902 (Vol. XIV, 143, 396).	R. M. Betham
Baroda, Birds nesting at, 1898 (Vol. XII, 221).	,,
Guzerat, Birds of South, 1886 (Vol. I,	H. Littledale

4. *Madras Presidency and South India—*

Travancore, Birds not recorded in Fauna from, 1898 (Vol. XII, 202).	H. Ferguson
Ootacamund, Birds nesting at, 1902 (Vol. XIV, 620).	R. M. Betham
Coonoor, Birds taken at—in May, 1904 (Vol. XVI, 153).	D. Dewar
Madras, Birds in and about, 1905 (Vol. XVI, 484).	,,
Nilgiris and Wynaad, Birds observed in, 1904 (Vol. XVI, 163).	A. M. Primrose
Coorg, Birds of, 1929 (Vol. XXXIII, 542).	F. N. Betts
Eastern Ghats, Report of the Vernay Scientific Survey of, 1932 (Vol. XXXV, Pt. I, 505).	H. Whistler and N. B. Kinnear

CEYLON.

Ceylon—

Uva Province Lunnugala, Notes on birds of Coco watte Estate, 1896 (Vol. X, 284).	A. L. Butler

The Andaman Islands

Andamans and Nicobars—

Andamans and Nicobar Islands, Birds of, 1899-1900 (Vols. XII, 386, 555, 684 and XIII, 144—4 parts).	A L. Butler.
South Sentinal Islands, Visit to, 1907 (Vol. XVIII, 201).	B. B. Osmaston
Barren Island, Visit to, 1908 (Vol. XVIII, 357).	,,

An account of the more recent work of the Society in the Ornithological field appears under Surveys and Expeditions undertaken in Mesopotamia, Persia and the Persian Gulf Islands, in the Eastern Ghats, in Hyderabad and Travancore.

The two last named States were surveyed by Mr. Salim A. Ali. An acknowledgment must be made here of the valuable work carried out by him at considerable labour and expense to himself. Mention must also be made of the Surveys carried out in Prome and Arrakan by Mr. J. K. Stanford and Mr. A. R. Villar with the assistance of the Society's Collector Mr. E. Henricks.

Equally important has been the work of numerous naturalists who have contributed a mass of detailed notes and previously unrecorded observations relative to the habits and nidification of Indian birds. The data so accumulated have been of the greatest assistance in the production of the new edition of the Fauna. It is difficult to select from among so many workers; but those which might be specially mentioned are Stuart Baker, the author of the New Fauna, Whistler, Ticehurst, B. B. and A. E. Osmaston, Inglis, Magrath, Fulton, Whitehead, Betham, Rattray, J. C. Hopwood, Wickham, Jones, Davidson, Bell, Barnes, Bailey, Donald, and Salim A. Ali. The progress that has been made in Indian Ornithology since the publication of the first edition of the Fauna is largely due to the labours of these men.

Reptiles, Amphibians and Fishes

The papers dealing with Reptiles in the Society's Journal are mainly the work of Col. F. Wall. His work in India extended for 30 years. He collected in all parts of the Indian Empire and by his energy and enthusiasm stimulated others to make collections for him. His papers admirably combine the popular and scientific side of the subject. A hundred and sixty-three separate contributions in the form of papers or notes on Indian Snakes appeared under his name in the Journal. This does not include his popular serial on Snakes of the Indian Plains which was published in 29 parts. It might safely be said that the greater part of what is known today of the Natural History of the snakes of India has been the result of his work in this field.

We must also mention the work of H. S. Ferguson who made various contributions to the ophiology of Travancore and of G. H.

1919

Col. F. W. WALL, I.M.S. (Retd.).

Evans who collaborated with Col. Wall in a number of papers on the snakes of Burma, of C. M. Ingoldby who collaborated with Miss Joan Proctor in a paper on the Reptiles of Waziristan, and Mr. H. M. Phipson who in Volume II wrote on the snakes of the Bombay Presidency. The papers on snakes include descriptions of a number of new species by Boulenger, author of the Volume on Reptiles in the Fauna of British India Series.

Snake Venoms and their Antidotes.

Several contributions on snake bite and its treatment have appeared in the Journal. They deal principally with the physiological action of snake venoms and the serums which scientists have given us to combat intoxication from these poisons. In May 1895, Professor T. Fraser of the Edinburgh University communicated a paper to the Royal Society of Edinburgh. Subsequently published in the *British Medical Journal,* it was reprinted in Vol. X, p. 113, as the subject was one of great interest to the people in India, where snakes are said to claim so many victims. In his paper, Fraser described his experiments to render animals immune against the venom of snakes, and discussed the antidotal properties of the blood serum of immunised animals.

His experiments, made mainly with the venom of the cobra, showed that a rabbit immunised by subcutaneous injections of gradually increasing non-lethal doses could receive as much as 50 times the minimum lethal dose without manifesting any serious symptoms of poisoning.

As far back as 1887, Sewal by injecting animals with very small doses of poison had succeeded in making them refractory to doses large enough to kill animals not so treated. In 1889, Kaufmann obtained the same results, Calmette followed with similar experiments in 1894. In the same year Phisalix and Bertrand announced that they had been able to secure immunity for guinea pigs against the venom of a viper.

Fraser's experiments confirmed those of the earlier investigators. They also indicated, as Calmette, Phisalix and Bertrand had shown, the preventive and therapeutic value of the blood serum of immunised animals in the treatment of snake bites.

Three years later, in 1898, the Society published an extract from Calmette's *Le Venin des Serpents* (Paris, 1896) in which he claimed that the serum prepared by him at the Pasteur Institute, Lille, was an effective antidote against the venom of all snakes (Vol. XI).

Then came a paper by Capt. George Lamb of the Bombay Bacteriological Laboratory, which he read before the Society in January 1902 (Vol. XIV).

It was a resumé of the subject as it stood at the time. Lamb outlined the methods of research, described the procuring of snake venoms, indicated some of the important physical and chemical properties of venoms, and considered the physiological actions of the venoms of the Cobra and the Russell's Viper. He showed the great difference which exists between these two poisons as far as their effects on the animal organism are concerned. Lamb contested Calmette's claim that his serum was equally effective against every kind of venom and gave reasons both *a priori* and experimental. He had tested Calmette's serum and had found it to be of no value in the treatment of bites of the Russell's Viper, the Krait or the Echis. Two years later Col. Bannerman took up the question in the *Journal*. He tabulated the physiological actions of the venoms of the Cobra, the Russell's Viper and the Banded Krait, and showed how the poisons of these snakes encompass the death of their prey in different ways (Vol. XV).

In November 1905, Lamb read a second paper before the Society in which he gave an account of subsequent investigations into snake venoms and their antidotes (Vol. XVII). A considerable amount of success had been achieved both in elucidating the exact physiological action of the venoms of different species and in preparing antivenoms. The venoms experimented with were those of the Cobra, the Russell's Viper, the King Cobra, the Saw-Scaled Viper, the Common Krait, the Banded Krait, and the Sea Snake (*Enhydrinavalakadien*). Of these the most poisonous of all was found to be that of the Sea Snake, next came the Krait, followed by the Cobra and King Cobra, then the Vipers; the Banded Krait being the least poisonous of all.

Antivenomous sera prepared from the venoms of various snakes in Australia and India showed that only the specific antivenom could be used with any effect in a case of snake poisoning. In India, we would require six different antivenenes for the venoms of the six poisonous species mentioned above. The preparation presents no special difficulty, in the case of the Russell's Viper and the Cobra. Lamb announced the preparation at the Pasteur Institute, Kasauli, of a polyvalent serum. This has proved to be a highly efficacious antidote for both the poisons of which it is prepared, but would be of little or no value for the bites of other snakes.

Papers dealing with Fishes consist mainly of notes on fish and fishing in the Indian seas and in various parts of the Indian Empire. They supplement the observations of the earlier workers on the ecology of Indian Fishes of which so little is known even today. They also include reports and descriptions of new species in collections made by members of the Society. Among them are Murray's descriptions of New Fishes obtained at Karachi, Boulenger's report on the Collections of deep sea fishes collected by W. F. Townsend in the Sea of Oman, and a report by C. Tate Regan, now Director of the British Museum, with descriptions of new species obtained by W. F. Townsend in the Sea of Oman, the Persian Gulf and Karachi. Notes and descriptions of Indian Fishes have also been published by D. Fowler of the Academy of Sciences, Philadelphia. The more recent contributions include reports and descriptions of fishes by Dr. Hora and Mr. Mukerji on collections of fishes made by Col. R. W. Burton and R. C. Morris in Southern India. A reference must also be made to the subsequent collection of Fishes made by Col. Burton in the Chindwin District, Burma, and the very important collection made through the British Legation at Kabul. These will form the subject of future papers by Dr. Hora and Mukerji in the Journal. Various papers on Pisciculture, including those dealing with the introduction of Trout into the Kashmir, the Nilgiris and Ceylon, have also appeared.

T. R. BELL, C.I.E., I.F.S. (Retd.)

Invertebrates

Papers in the Society's Journal on the various classes of Invertebrates deal to a greater extent with those which attract the attention of amateur collectors: Insects—butterflies in particular—and Molluscs.

Lepidoptera: Butterflies—

Papers on Butterflies include numerous contributions by Lionel de Niceville who, with Col. Marshall, was a pioneer in the systematic investigation of the Indian lepidopterous fauna and whose combined work gave so great an impetus to the study of butterflies in India. In the Journal, de Niceville described numerous new species and forms collected in the Oriental, Malayan and Austro-Malayan regions. In collaboration with Mackinon, he published a list of the Butterflies of Mussoorie and the neighbouring region (Vol. XI). The paper records the life histories of a large number of species found in the area.

The earlier volumes also contain contributions from Col. Chas. Swinhoe. After the death of Frederick Moore, he was entrusted with the completion of that magnificent work on Indian butterflies—the *Lepidoptera Indica.* While in India he was an indefatigable collector, working chiefly in the Bombay, Poona, Mhow and Karachi districts. His Lepidoptera of Karachi is one of the earliest systematic lists which appeared in the Journal (Vols. II and III).

Mr. T. R. Bell's papers on Butterflies comprise perhaps the greatest contribution made so far to our knowledge of the early stages of Indian Butterflies. He has discovered and described the life history of practically every butterfly that inhabits the North Kanara district of the Bombay Presidency (Vols. X and XI). Collaborators with him in this work were J. Davidson and E. H. Aitken. In 1909 Bell commenced his series of papers on the Common Butterflies of the Plains of India (Vol. XIX). The serial was started by L. C. H. Young (Vol. XVI), who had to give up the work owing to ill-health. Bell's serial was completed sixteen years later in Vol. XXXII. The work is a memorial to his painstaking labour. It contains his original and comprehensive descriptions of the life history and habits of practically all the species of Butterflies found in the Indian Plains.

The more recent volumes of the Journal contain a number of contributions from Brigadier W. H. Evans who with Mr. Riley of the British Museum has been entrusted with the revision of Bingham's work on Butterflies in the Fauna Series. Evans' first paper in the Journal was a list of the Butterflies of Chitral which he wrote in collaboration with G. A. Leslie in 1903. Since that time he has been a frequent contributor. His major papers include a Hand List of the Butterflies of India, Vol. XX, and the Identification of Indian Butterflies, providing keys to their classification (Vols. XXVII-XXXI), the classification of the genus *Mycalesis* (Vol. XXVII), a list of the Butterflies of the Palni Hills with descriptions of two new species (Vol. XXVII), and finally the Butterflies of Baluchistan (Vol. XXXIV).

Major Genl. H. C. Tytler who collected in many parts of India described a number of new species and forms obtained by him in

Gilgit, Hunza, Baltistan and in Burma (Vol. XXXI). Reference must also be made to Col. H. Peile's important contribution on the Butterflies of Mesopotamia (Vol. XXVIII).

In Vol. XXXIII, Riley wrote his revisional notes on the genus *Heliophorus* (*Lycaenidae*) and described new forms.

A number of systematic lists dealing with the butterflies of various localities in the Indian Empire have appeared in the Journal.

Kashmir and Ladak remain unknown and no list of the butterflies of this region has so far been published. Chitral was dealt with by Evans and Leslie (Vol. XIV). Simla, by Rhe Phillipe. For Mussoorie there is an excellent list by Mackinon which contains description of the early stages of a number of species (Vol. XI). The area was also dealt with by Ollenbach (Vol. XXIV). Hannyngton published a list of Kumaon Butterflies in Vol. XX. Nepal, Garhwal and Bhutan are unknown. Papers dealing with the Butterflies of the Assam Hill Ranges include Tytler's Butterflies of the Manipur and Naga Hills (Vol. XXI and XXIII) and the butterflies of the Mishmi Hills by Evans (Vol. XXII).

Burmese butterflies have been listed in papers by Watson on the Butterflies of the Chin Hills (Vol. X); Tharrawady and the Pegu Yomas by Ellis (Vol. XV) and Tavoy by Ollenbach.

Two areas in the Plains of the Punjab and the United Provinces have been worked—Lahore (Vol. XVI) and Lucknow (Vol. XXV) both by Rhe Phillipe.

The butterflies of the Central Provinces are listed in an excellent paper by Betham (Vols. V and VI). D. O. Witt has worked the Nimar District (Vol. XIX). The Bombay Presidency had a number of collectors in the earlier years. Reference has been made to the work of Bell, Davidson and Aitken. They published an account of the butterflies of North Kanara with descriptions and coloured figures of the earlier stages (Vol. X). Lists of the Butterflies of the Konkan, Matheran and Cutch appeared in Vols. XV, VII and XII respectively and of Jodhpur in Vol. XXXII. Swinhoe's List of the Butterflies of Karachi was published in Vols. II and III.

Areas in Southern India which have been reported on in the Journal are Travancore by Ferguson (Vol. VI), the Palni Hills by Evans (Vol. XX), Coorg by Hannyngton (Vol. XXIV), and Bangalore (Vol. XXXIV) by Yates.

Heterocera: Moths.

The most important contribution to the literature on Indian *Heterocera* in the Journal is the series of papers by Sir George Hampson on the Moths of India (Vols. XI-XXVII). They were intended by the author to supplement his volumes on Moths in the Fauna of British India series, which he considered little more than a setting in order of a vast subject. Sir George Hampson also collaborated with Dudgeon and Elwes in the preparation of their Catalogue of the Heterocera of Sikhim and Bhutan, published in Vols. XI-XVI. A number of new species of Indian Moths, from Tenasserim, Sikhim and Bhutan were described by Dudgeon in Vol. XVI.

In a series of papers published in Vols. XVI and XVII of the Journal, E. Meyrick described fifty new genera and 226 new species of Indian *Microlepidopetra* from collections obtained for him by various collectors in India, Burma and Ceylon. In addition numerous notes on individual species have appeared among these, a paper by Fellows-Mansion on the life histories of rare and little known Sphingidae (Vol. XVII) of the Oriental Region. A List by Prout of the Moths of Mesopotamia and N. W. Persia collected by the members of the Expeditionary Force was published in Vol. XVIII. Prout has also reported on the Moths of the Family *Geometridae* in a collection made by Capt. A. E. Swan in U. Burma (Vol. XXXI, part IV).

Neuroptera: Dragon flies etc.

In 1918, Fraser commenced his long series of papers in the Journal (Vol. XXV) on Indian Dragonflies. They have appeared almost without interruption to the present date and have run into over 40 parts. They formed the basis of his work on *Odonata* in the Fauna of British India series, the first volume of which was published in 1933. They helped to stimulate interest in this subject, and resulted in the collection of numerous specimens for the author by various members of the Society. The papers contain the original descriptions of a number of new genera and species obtained by the author and by others.

Termites.

The principal contributions on Termites were made by Revd. Fr. Assmuth. Unfortunately his valuable work was terminated with the outbreak of the Great War and his repatriation with other German subjects.

After Wasman had published his treatise on the Termites of the Continent of India in 1899, very little work was done till Assmuth took up collecting round Bombay. His collection was described by Nils Holmgren of Stockholm in Vol. XXI of the Journal. His work here helped to add in a large measure to our knowledge of the different castes of Indian termites and their habits. Assmuth also made extensive collections in Gujerat and Bangalore—the first from these areas. They were described together with additional material obtained in Bombay, by Holmgren in a second paper (Vol. XXII). Assmuth himself published a paper on the wood destroying white ants of the Bombay Presidency (Vol. XXII) in which he dealt with the means of identification and the habits of seven species in this area which destroy wood and wood work. The paper, at the request of the Government of Bombay, was distributed among the officers of the Public Works Department.

There have been various notes on the habits of termites; among them a paper by the late Dr. Anandale on Termite Mounds (Vol. XXX).

Orthoptera: Locusts etc.

In the summer of 1899 when the Locust, *Acridium peregrinum*, began to appear in large numbers in North Western India, the Indian Museum undertook at the request of the Government of India to collect information and publish a report on the subject. The report by E. C. Cotes of the Indian Museum was published in the Journal (Vol. VI). It indicates the breeding grounds of this destructive locust and gives its life history and habits, the different invasions that occurred, and the remedial measures adopted. An account of the Locust Invasion of 1889-1892 by the same author was published in Vol. VIII. A second paper by Cotes in the same volume gives an account of the locusts which from time to time have proved destructive in Bengal, Madras, Assam and Bombay.

A number of papers on the Orthoptera Acridiodea of Mesopotamia and North West Persia by Prof. Uvarov have appeared in the Journal. Among them is his report on the collections made in Mesopotamia and Persia by Buxton and others during the war (Vol. XXVII); Records and descriptions of Orthoptera from S. W. Asia (Vol. XXVIII) and descriptions of new and interesting Orthoptera from Persia, Baluchistan and Western India and Central Asia (Vols. XXIX and XXX).

Dermaptera: Earwigs etc.

The absence of any comprehensive work on Indian Forficularia (Earwigs) induced the articles by Malcolm Buer on the Earwigs of Ceylon (Vol. XIV). The paper is based mainly on collections made in Ceylon by Mr. E. E. Green and material in the British Museum, the University Museum of Oxford and the Royal Natural History Museum at Brussels.

Coleoptera and Hemiptera: Beetles and Bugs.

Contributions in the Journal on Beetles are limited mainly to ecological notes on species, particularly to those of economic importance.

Among the papers on *Hemiptera* is Kirkaldy's Memoir on Oriental Rhynchota which contains descriptions of a number of new genera and species obtained by E. E. Green in Ceylon (Vol. XIV). Kershaw's and Kirkaldy's notes on Oriental Hemiptera appeared in Vols. XVIII and XIX. The Hemiptera of the Bombay Presidency, based on a collection made by Wroughton, were described in a paper by Dr. E. Bergroth (Vol. XXIV).

Homoptera: Scale insects etc.

Papers on Homoptera which have appeared in the Journal are limited mainly to contributions on Cocodae or Scale Insects. Their economic importance is well known, and with the growing development of fruit culture in this country and the danger to the industry which may arise from these serious pests of fruit trees the interest in them will increase. The earliest publication in the Journal on Coccids is by the eminent authority Mr. E. E. Green, formerly Government Entomologist in Ceylon. His paper on the Coccidae of Ceylon (Vol. XVI) supplements his first volume published under the same title. It includes notes and descriptions of new species discovered after the publication of his work, the fifth volume of which was issued in 1922. In Vol. XXIII, Ramrao S. Kasargode wrote a preliminary account of the Coccidae of Western India. While an enormous mass of information has been made available on the Coccid Fauna of Ceylon through the labours of Green, and a considerable amount is known about these pests in North Eastern India because of their occurrence in the Tea Gardens, there is very little known about the species found in Western India. The remarkable impetus given in recent years to Mango cultivation in Western India will necessitate a greater study of these insects as a potential source of harm. The Coccids of South India have been studied by Mr. T. V. Ramakrishna Ayyar. One hundred and twenty-nine species are known to occur in South India. Out of these, 33 are of economic importance as pests or potential pests to agriculture. Notes and descriptions of these were published by T. V. R. Ayyar in Vol. XXII and again in a supplementary paper on Indo-Ceylonese Coccids (Vol. XXXI).

Hymenoptera: Bees, Wasps and Ants.

Bees and Wasps have not received nearly as much attention from Naturalists in India as Butterflies. The greater part of what is now known about these insects in India is due to the enthusiasm of a few workers. Most prominent among them was C. T. Bingham. Among entomologists in India his work will rank with that of Wood Mason and de Niceville. To few has it been given so signally to advance the study of the subject to which Bingham devoted himself. His large collections formed the basis of the Fauna volumes on *Hymenoptera* which he wrote. Previous to the publication of this work in 1897, Bingham contributed several papers to the Society's Journal. His first, published in Vol. III (1888), dealt with the collecting and preserving of *Hymenoptera*. In the same year, when Deputy Conservator of Forests in Burma, he published his Notes on the bees and wasps of Burma (Vol. III). In Vols. V and VIII he wrote descriptions of new and little known *Hymenoptera* from India and Burma. He described new species from the Indo-Malayan Region with a key to the genera of Indian *Pompilidae* (Vol. X) and reported on the collections made by Yerbury and Nurse at Aden (Vol. XII). In 1898, a year after the publication of his volume on Bees and Wasps in the Fauna series, Bingham reported on a collection made by Nurse at Deesa and Simla in which he described 23 new species.

Another early collector of *Hymenoptera* was R. C. Wroughton destined later to become a famous mammalogist, he devoted much of his time to collecting in Western India. In Vol. VI Wroughton wrote a paper entitled 'Our Hymenoptera'. Its purpose was to rouse interest in the subject, among members of the Society. Wroughton presented the greater part of his collections to the Society. His collection of Mutilid Wasps was reported on by Ernest André in his 'Contribution à la connaissance des Mutiles de l'Inde' (Vol. VIII) in which 14 new species obtained in various parts of the Bombay Presidency are described. The Ruby-Wasps (*Chrysididæ*), collected by Wroughton were described by Robert du Buysson in his 'Préimiere Contribution à la connaissance des Chrysides de l' Inde' (Vol. X). The author also examined a collection made by J. A. Bentham in the Central Provinces, and the material in the Indian Museum. The paper contains a synoptic table of Asiatic Chrysidids with descriptions of 14 new species.

After Bingham, the most notable collector of Indian *Hymenoptera* was Nurse. Col. Nurse on retirement from India took home a collection of some 3,000 specimens obtained in various parts of India. The collection contained 10 new genera, and over 100 new species. A reference has already been made to Bingham's descriptions of new species obtained by Nurse in Deesa, Simla and Aden. Nurse himself described the new Fossorial Diplopterous and Anthophilous species in his collections in a series of papers published in Vols. XIV, XV and XVI and in Vol. XIX described new Fossorial Wasps from Deesa. His collections were also studied by P. Cameron who described a number of new species obtained by Nurse in Deesa, Simla and Ferozepore. The Tenthredinid and Parasitic *Hymenoptera* obtained by Nurse in Baluchistan, Kashmir and the Bombay Presidency were described by Cameron in six papers (Vols. XVII and XVIII), the Aculeate *Hymenoptera* in Vols. XVII and XIX and the new genera and species of Ichneumonidae in Vol. XIX.

It will be seen that subsequent to the publication of Bingham's work in the Fauna of British India, a considerable number of new genera and species have been described, and a considerable mass of literature dealing with the taxonomy and biology of species already known has appeared in the Journal and in other publications. As a guide to workers in this subject a catalogue of new wasps and bees described from the Indian region since 1897, with references, was published by T. V. Ramakrishna Ayyar (Vol. XXIV, 1916). The catalogue also contains a list of the more important papers published since that date. It serves as a useful supplement to Bingham's Volumes. A reference must also be made to the collections made during the War by P. A. Buxton in Mesopotamia, Persia and the south end of the Caspian. They were reported on in Vols. XVII and XXVIII by F. D. Morrice, formerly President of the Entomological Society of London.

Ants.

Bingham's second Volume on *Hymenoptera* which deals with Indian Ants was published in 1903. In the introduction Bingham refers to a popular paper entitled 'Our Ants' by R. C. Wroughton which was published in the Journal (Vol. VII). Wroughton's article contains most of what was then known of the conditions of life, economy and habits of Indian Ants. In writing his paper he also had the advantage of Rothney's very interesting account of the habits of Indian ants published in the Transactions of the Entomological Society of London.

A great deal of the present day knowledge on this subject as far as it relates to India is due to the labours of these two men. Rothney's paper, which was read before the Entomological Society of London in 1889, was reprinted in the Journal (Vol. V). E. H. Aitken also interested himself in Ants, as he did in all things that lived and breathed. The Journal contains a note about his experiences with the Red Ant, written in his usual vein. But the greater part of what he knew about Indian Ants, EHA put into his 'Tribes on my Frontier' which contains lifelike pictures of the ways and habits of some of our commoner species.

Wroughton collected mainly about Poona, Rothney in Bengal. Other collectors in India were Bingham, Gleadow, Aitken, Simpson, Daly, Taylor, Ferguson, Yerbury, Watson, Palliser, and Bell—all members of the Society. Their collections were studied by that great specialist in Myrmecology, Dr. Auguste Forel of Zurich. Forel also had the advantage of examining Rothney's collection which served as the basis of Mayr's excellent work on Asiatic Ants (Beitrage zur Ameisenfauna Asiens, Verh. d. K. K. Zool. bot. Gesellsch. Wien, 1878) and the material sent to him by Wood Mason, Director of the Indian Museum. He published the results of his work in a series of papers 'Les Formicides de l'Empire des Indes et de Ceylan' which appeared in the Journal (Vols. VII, VIII, IX, XII & XVI).

The activities of members in the earlier years was followed by a lull in which the contributions on Indian Ants were limited to a few notes and observations by Aitken, Scott, Blatter and others. Of particular interest are Major Hingston's papers on the Red Ant (*Oecophyla smaragdina*) and the Black Ant (*Camponotus compressus*) which appeared in Vols. XXIX, XXX and XXXI. His various books, among them *A Naturalist in Hindustan,* contain much information about Ants and other Insects written in his always lucid and attractive style. They reveal a capacity for painstaking and accurate observation which has rarely been excelled.

Reference must be made to Durgadas Mukerjee's Report on a collection of Ants in the Indian Museum, Calcutta, dealing mainly with a collection made by the late Dr. Annandale in the Himalayas (Vol. XXXIV). In the same volume we published 'Ants and the Lac Insect' by Negi, Misra and Gupta of the Indian Lac Research Institute. The paper gives an account of Ants beneficial or harmful to the Lac Insect.

Thysanoptera: Midges.

T. V. Ramakrishna Ayyar published an Annotated List of the Thysanoptera known from India and Ceylon (Vol. XXX). In the paper an attempt is made to catalogue the known *Thysanoptera* of India and Ceylon as a working reference list. All records up to the year 1924 are as far as possible listed. In the same volume the author described two new species from South India. Although *Thysanoptera* form one of the major groups into which Insects are divided, little attention has been devoted to the scientific or economic aspects of their study in India.

Bagnall, in a series of papers in the Annals and Magazine of Natural History, has dealt with North Indian and Ceylonese forms; while practically all that is known about South Indian species has been derived from Aiyar's work.

In Vol. XXXIV, Aiyar and Margabandhu published a joint paper on *Thysanoptera* with notes and descriptions of new species. The paper is a supplement to a Memoir on Indian Thysanoptera published by the senior author in the Memoirs of the Department of Agriculture, India, Entom. Ser., Vol. X (7), 1928.

Diptera and Aptera: Flies, Mosquitoes, etc.

Contributions in the Journal on these two groups of insects deal mainly with species responsible for the spread of disease in Man and Beast in India.

The importance of knowing something about biting flies is manifest when one realises how many tropical diseases are conveyed by means of their bites. In Vol. XVII, Lt.-Col. Bannerman of the Bombay Bacteriological Laboratory, now known as the Haffkine Institute, wrote on the 'Importance of Blood-sucking Flies as transmitters of disease.' His paper indicated the lines on which investigation should be undertaken to determine which of these insects spread disease in India, and to what an extent.

In Vol. XXVII, Harold Russell published a series of informative papers on Parasitic Flies in which he described the life history and habits of various species.

Mosquitoes and Malaria.

Mosquitoes and Malaria have formed the subject of a number of important papers. The first which we published was by Lt.-Col. G. M. Giles. It was read before the Society on the 11th of December 1900, shortly after the interesting experiments conducted by Sir Patrick Manders in London had conclusively confirmed Ross' discovery fixing the Anopheles Mosquito as the carrier of the malarial parasite. Col. Giles in his paper made a plea for the collective investigation of Indian *Culicidae* with suggestions as to moot points for enquiry, and a prodromus of species known to the author (Vol. XIII). The importance of acquiring accurate knowledge of the various species of Anopheles, their life history and their habits was soon realised. The subject was next taken up by Major Manders who wrote Notes and Observations on the Anopheles of Ceylon with the life history of *Anopheles fuliginosus* (Vol. XV). The Anopheles of Karwar were listed by Dr. H. Cogill who recorded notes on seven species found in that locality, including two new species discovered by Aitken, (Vol. XV). In Vol. XVI, Theobald, the eminent authority on *Culicidae* reported on a collection made by E. E. Green in Ceylon. His paper contains descriptions of four new genera and eight new species. The Culicid Fauna of Aden Hinterland was studied by Dr. W. J. Paton while serving at Aden with the Native Field Hospital. Paton described five new species of Anopheles discovered by him, and recorded his notes on the life history and the breeding ground of Mosquitoes in Aden and surrounding country (Vol. XVI).

In Vol. XVII, Col. W. Glen Liston wrote on the epidemic of Malaria in the port of Bombay.

Liston's paper contained the first announcement of a discovery of the greatest importance to the people of Bombay. While investigating the causes of the epidemic of Malaria in Frere Road, Liston discovered that *Anopheles stephensi* was the mosquito responsible for spreading the Malaria in the city. His paper gives the interesting history of the discovery, describes how the insect may be identified in its various stages, and suggests preventive measures.

In 1909-1911 Dr. Charles A. Bentley carried out a systematic Malarial Survey of the Island of Bombay, which abundantly confirmed Liston's discovery that *A. stephensi* was the one vector of Malaria in the Island. Bentley wrote a valuable paper on the Natural History of Bombay Malaria (Vol. XX). He summarised the results of his investigations and gave a detailed account of the life history of *Anopheles stephensi,* its temporary and permanent breeding places in the Island of Bombay, its natural enemies and gave a key to the identification of the species of Anopheles found in this area.

In 1928 a second Malarial Survey of the Island of Bombay was carried out by Major G. Covell. In his paper on the 'Malaria Problem in Bombay' (Vol. XXXIV), he gave the results of his Survey which indicated that the distribution of Malaria in the city had changed considerably during the 17 years that had elapsed since Bentley presented his report. He gave the reasons for the persistence of Malaria in Bombay and suggested the methods for its control.

Fleas and Plague.

Plague, owing to its early cruel association with the Bombay city, naturally received attention in the Journal. In 1904, Liston published his paper on Plague Rats and Fleas (Vol. XVI). He discussed the causes of the disease, the various species of rats connected with it in Bombay, and the Rat Flea which carries it. The Rat Flea (*Pulex cheops*), it is known, is not generally found on Man. This knowledge had up to the time prevented the acceptance of the theory that fleas were responsible for the spread of plague. In this connection again Liston made a discovery of outstanding importance. He had the good fortune to discover the circumstance under which the rat flea attacked man and so explained exactly how the disease was spread. His paper gives the history of his discovery, so important to the devising of remedial measures against the spread of Plague.

Arachnida: Scorpions and Spiders.

In the preface to his volume on *Arachnida* in the Fauna series, Mr. Pocock, the author, acknowledges his special indebtedness to Mr. Wroughton and Mr. Phipson whose influence and energy in procuring the material which helped to form the basis of his work, had vastly increased our knowledge of Indian Arachnology. Both Wroughton and Pocock, now reputed mammalogists, devoted their earlier interests to other branches of Natural History and curiously enough the first paper on scorpions in our Journal was by a famous ornithologist—Eugene Oates. In 1888, Oates' paper on the Scorpions of the genus *Isometrus* of India and Burma was read before the Society (Vol. III). Pocock's first contribution to the Journal on Scorpions was a report on a collection sent to the British Museum by Edgar Thurston of the Madras Museum (Vol. VII). In Vol. VIII, Pocock wrote his most interesting paper on the 'Habits of Scorpions'. The literature on the subject was not voluminous at the time and not much more has been added to our knowledge since the time Pocock wrote his article. We know little about the ways and habits of Indian Scorpions.

In 1896, a considerable effort was made by the Society at Pocock's suggestion to collect scorpions from all parts of India. Mr. Wroughton and Phipson particularly interested themselves in the work and a collection of nearly 1,000 specimens was sent to Pocock from all parts of India. The result was the addition of a number of genera, species, and forms, new to the Indian Fauna. Our knowledge of the range of structural variation and the geographical distribution of previously known species was also considerably increased. The new species and genera were described by Pocock in the Journal (Vols. XI, XII, and XIII). Subsequent to the publication of the volume on Arachnids: the contributions on Scorpion in the Journal are limited to stray notes on individual species. In 1928 an appeal was made by Rev. Fr. Caius for live scorpions for an investigation he proposed to conduct at the instance of the Society into the toxicity of the venoms of Indian Scorpions. It resulted in the collection of a number of scorpions from all parts of India. Various Provincial Governments co-operated in this work and specimens were sent in by Hospitals and Dispensaries. Father Caius published lists showing quantities of venom obtained by him from different species (Vols. XXXIII and XXXIV).

Spiders.

The first paper on Spiders in the Journal is Pocock's review of the species of Galeodes inhabiting India and Ceylon. The Galeodes, popularly known as 'Jerry-mundlums' differ widely from spiders in structure and constitute a distinct order of Arachnids. In his paper the author describes four new species and gives a key to the identification of Indian forms.

In his diagnosis of some new Indian Arachnids (Vol. XIII) Pocock described 3 new genera and 25 new species. In the same volume the Society reprinted Pocock's paper on the Great Indian Spiders of the genus *Poecilotheria,* first published in the *Annals and Magazine of Natural History*. It gave an account of the habits and history of the various species found in the Indian Empire and described four new species. Madam Merian was the first to make known the existence of these great spiders. They are perhaps better known under the generic name of *Mygale* and are frequently, though erroneously, referred to as Tarantulas. She stated that in Surinam they feed largely on ants and that they occasionally took young humming birds. Her observations were subsequently confirmed by Bates and others. But from this small substratum of fact, established by Madam Merian, arose the widespread and sensational belief that birds constituted the staple food of these giant spiders. In Vol. XIII, Pocock described 38 new species of spiders of various genera collected by Wroughton, Phipson and other members of the Society. The more recent Volumes of the Journal contain notes on the ecology of individual species. Among them is Hingston's most interesting paper on the Snare of the Giant Wood Spider (*Nephila maculata*) (Vols. XXVIII and XXIX and Gravley's article on Common Indian Spiders) (Vol. XXVIII).

Myriapoda : Centipedes, Millipedes, etc.

The neglect of this group as a whole by Naturalists in India is not difficult to explain. The species that compose it are lacking in all those attributes which recommend more favoured ones to the notice of collectors.

Pocock wrote a report on a collection of Myriapods sent to him from Ceylon by E. E. Green and from various parts of India by Edgar Thurston. His paper describes a number of new species of Chilopoda and Diplopoda.

A monograph on the Pill Millipedes (*Zephroniidae*) inhabiting India, Burma and Ceylon was published by the same author in Vol. XII. In Vol. XXVIII Brolemann reported on a collection of Myriapods obtained by Buxton in Mesopotamia.

Mollusca: Snails etc.

Papers in the Journal on Molluscs are confined mainly to the fauna of Bombay, and to descriptions of new species obtained in the Arabian Sea and Persian Gulf.

The earliest contribution on Bombay Molluscs is a paper by Mrs. W. E. Hart on the Post-Pliocene molluscs found by her in a much abused region known as the 'Bombay Flats', a low lying area in a now populous quarter of the city, which was once overrun by the sea. Perhaps the example set by the Prince Consort made conchology a popular hobby in Victorian times. But the fashion is now on the vane. But to these earlier collectors we owe much of what is known of the Marine Molluscs of our coasts. The Bombay shores provided a well favoured, specialised and little explored region. Most prominent among collectors here was A. J. Abercrombie who collected intensively round Bombay during several seasons. In 1892 a paper on the Marine Molluscs of Bombay was published in the *Memoirs and Proceedings of the Literary and Philosophical Society, Manchester*, by J. Cosmo Melvill and A. J. Abercrombie. It enumerated 320 species collected round Bombay by Abercrombie. In Vol. VIII of our Journal, Abercrombie published a resumé of this paper with notes and descriptions of the various species. In the same volume Melvill's description of 25 new species of Marine Molluscs was reprinted from the Manchester publication. A second paper by the same author describing further new species discovered in Abercrombie's collection was published in Vol. XI and in Vol. XXI. Edgar Smith described a new species of *Acmaea* obtained by Abercrombie in Bombay.

The Land and Freshwater Mollusca of Bombay were dealt with in a paper by A. J. Peile (Vols. XI and XII). In Vol. XII Blanford published a supplementary note to Peile's paper.

While Abercrombie was collecting in Bombay, the Marine Molluscs of Karachi and the Persian Gulf were being assiduously explored by W. F. Townsend.

A catalogue enumerating 935 species of Mollusca collected between 1893 and 1900 by Townsend in the Persian Gulf, the Gulf of Oman and the North Arabian Sea was published in the Proceedings of the Zoological Society of London (1901) under the joint authorship of Melvill and Standel. In the interim 1901-1903 further collections were made by Townsend. These new species obtained by him were described by the same authors in our Journal (Vol. XVI).

Gordon Dalgliesh published a short list of the Fresh-water Molluscs of Tirhoot, Bengal, and in Vol. XXVIII Dr. Marshall gave a list of Marine and Land Molluscs of Rangoon.

BOTANY

In reviewing the Botanical Papers which have appeared during the past fifty years in the Journal of the Society, it is not surprising to find the names of some of the more prominent and older botanists who have contributed so much to our knowledge of the flora of this vast country. In the Journal these men have prepared the basis of future *Regional Floras.*

The Hon'ble H. M. Birdwood was the first to attempt a local flora. He contributed a paper entitled *A Catalogue of the Flora of Matheran* in Volume I. Later he added to the flora of Matheran that of Mahableshwar. This was again revised and reproduced in Volume X. Theodore Cooke, the author of the *Flora of the Presidency of Bombay,* which still remains the standard work for the Presidency, commented on Birdwood's production. Likewise we find the names of A. K. Nairne, the author of *Flowering Plants of Western India,* which was intended to be a semi-popular work, Col. Kirtikar, the author of *Indian Medicinal Plants,* which appeared after his death, Dr. J. C. Lisboa, Col. W. Dymock, author of the *Pharmacographia Indica,* J. F. Duthie, who has contributed much to our knowledge of the flora of the north-western portion of India, Dr. Prain, W. A. Talbot, author of the *Forest Flora of the Bombay Presidency and Sind,* T. F. Bourdillon, G. Carstensen, G. A. Gammie, who contributed to our knowledge of the Orchids of the Bombay Presidency, Rev. F. Theissen, a world famous authority on *Fungi,* Rev. E. Blatter, who has contributed much to our knowledge of Indian Botany. Blatter has often collaborated with the late F. H. Hallberg and with C. McCann. There are numerous other names, too many to mention here.

The section of the *Journal* entitled the *Miscellaneous Notes,* contains much valuable information contributed by many members. The dawn of botanical interest in the Journal commenced with a note *On an Instance of Fructification in a Staminiferous Plant, Carica papaya,* by Surgeon-Major G. Bainbridge in Volume I. The bulk of the botanical papers contributed to the *Journal* deal mainly with the flora of the Bombay Presidency, with scattered records of various parts of the Indian Empire and the adjacent countries. Papers will be found dealing with North West India, the Himalayas, both East and West, Rajputana, Punjab, Peninsular India, Burma and the Laccadives. The contributions deal mainly with Phanerogamic botany with occasional papers on Cryptogams. The

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reason for this is undoubtedly due to the difficulty of dealing with Cryptogams and the absence of literature.

In dealing with a review of 35 volumes of the *Journal* covering the flora of a vast Empire, besides recording the work that has been done, it is perhaps better to present the matter in a form that will also serve as a useful reference.

India (General).

Phanerogams: Mrs. J. C. Lisboa published an article dealing with the odoriferous grasses of the genus *Andropogon.* W. Wedderburn wrote a paper on the drought resisting plants suitable for India. Rev. E. Blatter contributed a well illustrated serial on the Palms of British India, both indigenous and introduced. This work was subsequently published in book form.

Cryptogams: Rev. F. Theissen, published a paper dealing with the Indian species of Fungi.

N. W. India.

Cryptogams : C. H. Hope contributed a series of articles on the Ferns of North Western India and the adjacent countries. This paper forms a useful addition to Col. R. H. Beddome's *Ferns of British India, Ceylon and Malay Peninsula.* Beddome also contributed to the pages of the Journal. R. N. Parker wrote a paper on the Cacti growing in N. W. India.

Cryptogams: A paper on the Mosses collected by J. Fernandez was published in Volume XXXIII.

Kashmir.

Phanerogams : J. F. Duthie gives an account of a botanical tour undertaken by him in Kashmir in the year 1892. J. H. A. Ivens has contributed a note on the flora of the Vale of Kashmir.

Western Himalayas.

Cryptogams: S. R. Kashap published a paper on the Liverworts of the Western Himalayas and the Punjab, with notes on known species and descriptions of new ones.

Eastern Himalayas.

G. A. Gammie published an account of a botanical tour undertaken by him in Sikkim in the year 1892.

Punjab.

Phanerogams: J. C. Bamber contributed a series of papers on the plants of the Punjab. J. C. Martin published an account of the plants gathered in and about Mussoorie in the year 1908.

Cryptogams: J. C. Martin contributed a list of the Ferns found in and about Mussoorie in the year 1918. S. R. Kashap includes the Liverworts of the Punjab in his paper already referred to under the Western Himalayas region.

Rajputana.

Phanerogams: E. Blatter and F. H. Hallberg published a serial on the Flora of the Indian Desert. This was the result of an expedition undertaken by the authors in company of two students of St. Xavier's College during the months of October and November 1917. The area traversed by the party commenced from Jodhpur and continued to Phalodi, Bap, Jaisalmer, Barmer and Luni.

United Provinces.

Phanerogams: J. F. Duthie described a new species of *Androsace* from Jaunsar and Tehri-Garhwal, in the Tons Valley.

Cryptogams: G. O. Allen contributed a paper on the Charophytes from Gonda.

Central Provinces.

Cryptogams: J. D. Graham published a paper on the Ferns collected at Panchmarhi.

Bombay Presidency.

Phanerogams: The names of Birdwood and Cooke have already been mentioned in connection with the Bombay Flora. The first floristic lists and notes were of the two well known hill stations of Matheran and Mahableshwar. Birdwood published the flora of these two hill stations, a paper on the hill forests of Western India and another on the vegetation of Sind. Dymock contributed a paper dealing with the vernacular names of plants, and another on the means of self-protection possessed by plants. Nairne published an address to students on the botany of Western India, followed by an elementary botany for the Bombay Presidency. Lisboa specialised in the grasses of the Presidency and published a list of the Bombay grasses, and later a serial on the same subject. Kirtikar wrote a serial on the Poisonous Plants of the Presidency. Woodrow studied the plants of the Bombay swamps and published the results of his investigations. This was followed by a listic flora of Western India. W. A. Talbot published several papers dealing with the flora of the Presidency and described several new species. W. P. Symonds contributed a paper on the lilies of Mahableshwar. G. M. Ryan wrote on the water yielding plants observed in the Thana district. G. A. Gammie published a serial dealing with the Orchids of the Presidency. Among the more recent writers on the flora of this Presidency we find the names of E. Blatter who has devoted much of his time to it. He published a paper on the Flora of Cutch, and another on the Flora of Panchgani; this was followed by a paper on statistico-biological notes on the Flora of the Presidency. In collaboration with Hallberg, Blatter contributed a paper on the revision of the genera *Rotala* and *Ammannia*, a paper on new Indian *Scrophulariaceae*, and notes on the same order. Blatter also undertook the revision of the Bombay Flora necessitated by the numerous monographs and floras that have appeared of recent years. In this work McCann has frequently collaborated with him. Under their combined names the descriptions of several new species recorded from the Presidency have been published in the Journal.

The late L. J. Sedgwick devoted much time to the geumiferous Orders of the Presidency, and published a list of the grasses of Ahmedabad and Surat, and finally a paper on the *Cyperaceae* of the Presidency. He also produced a paper on the herbaceous monsoon flora of Castle Rock together with a description of a new Balsam. Kulkarni contributed a paper on the drugs of Sirsi and Kappat. H. M. Chibber contributed a paper on the derivation of scientific terms.

Cryptogams: Macpherson contributed a list of the Ferns gathered in North Kanara. Sedgwick contributed two lists dealing with the Moss flora of the Presidency.

Madras Presidency.

Phanerogams: C. E. C. Fischer, who is at present engaged on the flora of the Madras Presidency, contributed two papers dealing with the flora of Ganjam. Blatter and Hallberg published some notes on a botanical tour to the High Wavy Mountains undertaken in May 1917. Blatter also published a contribution to the flora of N. Coimbatore.

Travancore.

Phanerogams: T. F. Bourdillon contributed descriptions of new and rare trees from Travancore and the description of a new species of *Ficus* from the same area.

Burma.

Couchman published a paper on the Fauna and Flora of the Kachin Hills.

Ceylon.

Cryptogams: E. Blatter contributed a paper on the Ferns of Ceylon in the Herbarium of the Society.

Laccadives.

Prain contributed a paper on the botany of the Laccadives, being the results of the H. M. I. M. Survey Steamer 'Investigator'.

General.

G. Carstensen contributed a paper on seed dispersal in Volume III. He also contributed several papers chiefly relative to gardening. Mrs. M. Robinson published a series of popular articles on the 'Flowerless Plants'. A series on the Beautiful Indian Trees by E. Blatter and W. S. Millard was commenced in Volume XXXIII and is still appearing. This series was started with the idea of enabling the layman to name the more conspicuous trees for himself. The articles are well illustrated with coloured and black and white plates.

The Journal contains numerous articles dealing with almost every branch of botany.

POPULAR ARTICLES

In reviewing the papers published in the Society's Journal it should first be noted that as a publication it is unique in that it combines scientific papers with purely popular articles on Natural History, and as such makes an appeal both to the layman and to the scientist. We give below some extracts which will indicate the wide range of subjects dealt with.

Vol. I

The Waters of Western India.

A feature of Vol. I is an article entitled 'Notes on the Waters of Western India', which in so far as fish and fishing are concerned was a great help to the editors in their recent article on 'Game Fishes of Bombay, the Deccan, etc.'—The paper describes the natural life in or on those waters in all its varied forms. The editors only wish they had such writers with them now. The article was signed 'Keswal', the nom-de-plume of Mr. W. F. Sinclair, I.C.S.

Poisonous Lizards.

The 'Bis-Cobra', so amusingly referred to in 'EHA's' books, crops up in this number, as an Under Secretary to the Government of Bombay writes to Mr. Phipson in regard to seven deaths in Guzerat, officially reported as due to a poisonous lizard. Mr. Sterndale gives a personal reminiscence of a specimen of the only known poisonous lizard in the world, the *Heloderma* of the S. W. States of America and Mexico. It had been presented to the Zoo in London by the late Lord Avebury—then Sir John Lubbock.

A Kanarese Trio.

The fourth number contains a further contribution from 'Keswal' and the first from Mr. J. Davidson, I.C.S. He was one of the trio of devoted naturalists who loved the jungles of Kanara.—'EHA', Davidson, and T. R. D. Bell. The last named so loved Kanara that when transferred to Sind he grew a beard, the sight of which by Lord Lamington caused—as was planned by the wily Forester—his immediate retransfer to Kanara.

The Breeding of Poisonous Snakes for Reward.

Government, having tested the Society's knowledge as regards poisonous lizards, next approached us for information on the breeding of poisonous snakes for Government reward. Mr. Phipson had no hesitation in saying that such a thing was highly improbable, and gave his reasons. Many years later the Society published a special Chart showing the distinctive characters of the skulls of the Wild Dog and the Jackal—the latter having been frequently put forward as the former for the purpose of obtaining the Government reward.

Vols. II. & III.

Can Snakes hear?

Mr. Phipson gave the answer in Volume II 'Snakes have no external ears, and it is very doubtful whether the cobra hears the music at all. The vipers, which are far less timid, cannot be frightened in this manner, and consequently they are not used for these performances. The snake-men will tell you that the Daboia, the largest viper, or adder, of the East, is a dull snake with no ear for music, and it is interesting to note that they have evidently been repeating this nonsense ever since the time of David.'

'Ghore Pore' in a letter on the subject to the editors in Volume III writes 'I fully agree with the Honorary Secretary of the Natural History Society, Bombay, who wrote as follows:—

' "The explanation lies I believe, in the fact that, although snakes cannot hear air-vibrations, they are particularly sensitive to earth-vibrations, and can, on a dry soil, feel the footfall of any animal at a considerable distance. The result is that one generally gets only a glimpse of the snake as it is making off, and, as the Irishman said of the flea, 'when you get to where he is, he isn't there'. Tree-snakes however, can be easily approached, as they lie coiled up in the branches of a bush. The 'checkered water-snake' (*Tropidonotus piscator*), and the common 'dhaman' (*Ptyas mucosus*) may also constantly be seen lying on rocks 'basking', or more probably waiting for frogs or small fish. If there is any water between you and the snake it naturally acts as a buffer to the earth-vibrations, and so long as the snake does not see you, you may approach it and talk as loud as you like without disturbing it."

'Last week—Christmas—a juggler came round with snakes. I asked him why he stamped his feet or kept dancing when playing his nag zur (musical instrument). He replied, venomous snakes cannot hear air, but only earth-vibrations. I tested his assertion as follows:—

1. I placed the *garodiwallah* in front of the cobra playing his *nag zur* and dancing; as usual the snake was charmed.

2. I stood motionless in front and placed the juggler at the back of the cobra, but only playing his horn without moving. The snake was quiet, with hood erect and looked only at me.

3. We reversed positions, but the juggler played his pipe. I stood about three yards behind the snake; there was not a move in it, although I clapped my hands. But when I moved the cobra turned round to see "who comes there".' 'Ghore Pore's' theory was confirmed by experiments carried out by Col. F. Wall some years later.

Vol. IV.

The Saw-scaled Viper or Phoorsa (Echis carinata).

In Vol. IV, Mr. G. W. Vidal, I.C.S., writing on the Venomous Snakes of North Kanara, draws attention to the Phoorsa or Saw-scaled Viper—*Echis carinata* as being responsible for more deaths from snake bite than any other poisonous snake in India. He refers to the extraordinary abundance of this viper in Sind and the Konkan and, as regards the Konkan, points out that during the six years 1882-1887 the number of *Echis carinata* killed in the Ratnagiri District averaged 225,721 annually, whilst the total number of snakes killed in the Bombay Presidency during those years averaged 273,186.

In the figures given for snakes destroyed in Ratnagiri Mr. Vidal relied on personal observation for assuming that all, or nearly all, the snakes destroyed were *Echis*. He points out that the truth is no other snakes but *Echis* are, or can be, systematically hunted and found in great numbers. He tells us that in 1862, when the reward for Phoorsas was tentatively increased from 6 pies to two annas a snake, 115,921 Phoorsas were killed and brought in for rewards in Ratnagiri within eight days—December 2nd to 10th—and he calculates that had the reward been continued without limit as to total expenditure, five millions of Phoorsas would have been destroyed within one year!

The majority of our readers know that at most Civil and Military Hospital in India now-a-days there is kept a stock of antivenene which is a definite cure for the poison of the Cobra and the Russell's Viper (*V. russelli*). No sera against the venoms of the Phoorsa or of Indian snakes other than the two mentioned are available. Fortunately, however, only about 20 per cent of their bites prove fatal.

Locally—in Ratnagiri—people believe in a remedy first brought to light about 1873 when Mr. J. Elphinston was Collector of Ratnagiri. This is a shrub (*Pogostemon purpuricaulis* Dalz. in Hook.) called in the Konkan *Pangla*, the root of which, if masticated and also if applied to the punctured part like a plaster, was said almost instantly to stop all the haemorrhage. We remember it was tried as a remedy when Mr. Cabral was bitten in the Society's room; he was however bitten in the forehead and died within 24 hours, whereas in the usual course death does not ensue for from 7 to 10 days. A paper on the curative value of this plant in the treatment of *Echis* poisoning was subsequently published by Brigade

Surgeon Dymock, author of the *Pharmacographia Indica*. An investigation of the properties of the plant revealed an alkaloid principle in the root. Resinous principles were also present with astringent matter. But nothing really sufficient to account for any remarkable styptic properties.

Vol. V.

Prehistoric Bombay.

In this volume Mr. W. E. Hart contributes an excellent and very readable paper on pre-historic Bombay from which we learn that the foundations of our City 'were laid in scenes of desolation and death, amid the horrors of heaving earthquakes, when the land was rent by the fury of volcanic fires and swept of life by glowing lava floods'.

Mr. Sinclair, I.C.S., as a result of Mr. Hart's paper contributes a readable article in the same Volume on the Physical Geography of the neighbourhood of Bombay.

Gardens in Bombay.

Considerable progress has been made since 1890 so far as the Public Gardens of Bombay are concerned, though the substitution of modern blocks of flats for bungalows standing in their own compounds had adversely affected the private garden. Lovers of gardening in Bombay will find however that Mr. Carstensen's paper on Bombay Gardens in 1890 will still be a great help to them in the year 1933.

Vol. VI.

The Journal grows in size and we find Vol. VI double the girth of Vol. V.

In this Volume, Mr. E. C. Stuart Baker makes his debut as an Ornithologist and commences an association with the Society's Journal which has remained continued almost uninterruptedly for the last 42 years. His first contribution, a paper on the genus *Chloropsis*, which was read before the Society at a meeting held on the 31st March 1891 was published in No. 1 of this volume. In the same Volume Lt. H. E. Barnes completed his serial on Birds nesting in western India which commenced in Volume III and which gave a list and descriptions of the nest and eggs of birds known at the time to breed in the Bombay Presidency. In his task Barnes received the able assistance of J. Davidson, Col. Butler, Mr. S. Doig and Professor Littledale—all keen ornithologists in their time.

A King Cobra's Nest.

Mr. Wasey writing from Castle Rock tells us how he shot a female King Cobra sitting on her nest which consisted of a heap of dried leaves, described by the Indians as a 'Gadi'. The snake having been killed, the eggs—thirty-three in number—were found at the bottom of the heap. The embryos were found in an early state of development.

A Tiger Eating a Snake.

'Does a tiger kill snakes?' is a query raised by J. D. Inverarity who, on opening the stomach of an old tigress he had shot, found inside it the tail end of a snake that the tigress had bitten off and swallowed whole; the portion swallowed measured 2 feet 3 inches in length. He says 'The natives thought that the tigress had caught the snake in the water when she went to drink'.

The Brahmani Kite.

W. F. Sinclair, I.C.S. writes an excellent article entitled 'Up a Hill' descriptive of Raigarh, the old mountain metropolis near Mahableshwar. He ends up with a moral illustrating the corruptive habits of man. He says: 'It was near Raigarh that a guest of mine shot a Brahmani kite (*Haliastur indus*) with a living garfish in its claws, which he and I both saw it catch from the water, with the action of its big brother, the Sea-Eagle. I think this is the natural action of *Haliastur,* and that it only takes to carrion and garbage when corrupted by the neighbourhood of man. I think I have mentioned before in these pages, having seen one attack and severely injure a hare, which it would have killed, but for my own interference'.

Vol. VII.

Wild Dogs and Jungle Stories.

Professor Littledale—then of the Baroda College—gives in this Volume a most interesting account of Wild Dogs and their habits, and the extraordinary stories and beliefs told by the jungle tribes.

In connection with extraordinary beliefs he relates that after killing a Cobra with a rifle bullet he told the men who came up to stretch him out to measure him—it was five feet eight inches exactly—'one of them pointed to his tail, which was blunt and whitish, as if the end scales had come off, and another said to me "That Cobra has bitten some man. The end of the tail always drops off when he bites any one." ' All the men seemed to be quite familiar with this curious belief. It may be new to some of the members present, as it was to me.

Vol. VIII.

Somaliland.

Volume VIII, published in 1893 and 1894, reminds us that a well-known hunting ground in those days for Indian sportsmen is no longer availed of—Somaliland. Mr. J. D. Inverarity wrote a description of the animals he met there in Volume VI, and in this

Volume C. G. Dodgson, I.C.S. writes on sport in Somaliland during the 10 weeks he was there in the early part of 1893.

Lockwood Kipling's 'Beast and Man in India'.

There is an amusing review of Mr. J. Lockwood Kipling's book *Beast and Man in India.* Lockwood Kipling was the Principal of the School of Art in Bombay before he went to Lahore, and Bombay expresses pride in Rudyard Kipling being by birth one of its citizens.

The reviewer refers to two somewhat curious limitations in the author's view of his subject. He says these are revealed on page 13 of the book where Mr. Lockwood Kipling writes 'in a few generations we may hope for an Indian student of Natural History. At present this splendid field is left entirely to European observers, who mostly look at nature along the barrel of a gun. Which is a false perspective'. The reviewer writes 'The full stop at "gun", we may remark, is false punctuation; but, perhaps, the printer's !'

But in what world does Mr. Kipling live? Any month in Bombay we could show him a room full of Indian students of Natural History, and as to the Europeans who 'look at nature along the barrel of a gun,' many of them have taken that view of the tiger and the panther. Whether their perspective was true or false, let the re-peopled villages of Khandesh (for instance) tell. Whether a sportsman can be a naturalist or not, our own columns bear abundant witness here. And as a matter of fact, there never was a sporting society less animated by a mere love of slaughter, or more by a taste for observation and inquiry, than that of Western India at the present moment.

Later on the reviewer refers to another false perspective in the chapter on reptiles. He writes:—

'The chapter is headed with what he calls an "Anglo-Indian Nursery Rhyme," which runs as follows:—

"And death is in the garden
Awaiting till we pass
For the krait is in the drain pipe,
The Cobra in the grass."

Now there *may* be gardens in India where these things are; but even in such a garden of horrors, the snakes do not lie in wait for the passing of children to bite them. As the child passed, the krait would shrink further into his drain-pipe, and the Cobra glide away through this grass.'

Where do Swallows Sleep?

'EHA' puts a query to which we do not find an answer. Where do Swallows in India sleep? He writes 'In the cold season most parts of India swarm with Swallows, which perch in long rows on the telegraph wires, but not on trees, in the day time. They are not on the wires at night, and I very much doubt their resorting to trees at that time. I think it likely that they sleep in company like Bee-eaters; but though I have often startled a company of Bee-eaters from their roosting tree, I never startled a sleeping Swallow.'

Vol. IX.

Man-Eating Panthers and Tigers.

Stories—reliable ones—of Man-eating Panthers and Tigers always interest one. There is a good account by J. D. Inverarity in Vol. IX of his experiences with Man-eating Panthers in the Northern part of Hyderabad territory in the hot weather of 1894. In Vol. XIV there is a rather gruesome photo of a man-eating Panther and its kill. The photo was taken by W. A. Conduitt in the Seonee District, and the panther—shot over its kill—had been known to have killed over twenty people in rapid succession within a radius of fifteen miles. In Vol. XV Mr. L. S. Osmaston relates the story of a man-eating panther who came from the Dangs in the famine of 1900-1901 into the Muther Valley in the Nasik Collectorate, and between February 1901 and January 1902 killed twenty-four people at once, six more 'died of wounds' and it mauled eleven more who recovered. The panther was finally disposed of over the body of a boy who had been attacked some months before by this panther and mauled but had recovered—thanks to the attention of Mr. and Mrs. Osmaston.

Following up Wounded Tigers.

Panthers have however taken us away from our review of the Journal in chronological order and we turn back to Vol. IX and a paper on 'Wounded Tigers—How should they be killed?' by Reginald Gilbert, a mighty hunter—Solicitor—and friend of J. D. Inverarity. He wrote with a shooting experience in India of over seventeen years. His paper is well worth reading and his advice may best be summed up in a note he gives as a P.S. written after his paper had been read at one of the monthly meetings of the Society. He writes 'A friend has drawn my attention to Rice's book on Tiger shooting in India. This book, which is now very difficult to get, was published in 1857, and I see the author holds exactly the same opinions as I do. At page 57, after alluding to forming up the party, he says: "The whole party in a compact body keep close together, move at a snail's pace, yell with their utmost power, and create what really is a most infernal din. No tiger will face such a mass of men and noise as this. They sometimes charge down within even a few yards, but then invariably turn off, mostly getting well peppered or are shot dead in the attempt. With this system there is perfect safety to every one, no matter how dense the jungle may be." It may be noted the author gives his party's bag in Rajputana for one year at 68 tigers killed and 30 wounded, 3 panthers killed and 4 wounded. Bears killed 25, wounded 26. Oh, ye gods!'

Vol. IX contains several incidents of Tigers killing Bears—one of a tigress killing a rather large panther and a photo of a 10 feet 4 inches *Python molurus* shot just after it had embraced and killed a Langur.

Vol. XI.

Indian Ducks and their allies.

Volume XI, published between June 1897 and July 1898, sees the beginning of Stuart Baker's articles on the Game Birds of India which is still current in the Society's Journal. The series of papers which began in this Volume and continued in several subsequent ones, under the title 'Indian Ducks and their Allies' formed the first of the three volumes on Game Birds subsequently published in book form by the Society. The second volume deals with Bustard, Snipe, Sandgrouse, and the third with Pheasants. Further volumes on Quails and Partridges and Waders remain to be published.

Crocodiles.

There is an interesting reprint from the *Field* of an article by 'Smoothbore' on Crocodiles. At the beginning of his paper he writes: 'The greatest confusion still exists even amongst educated men as to the difference between the crocodile and the alligator, and also as to their geographical distribution. In India there are no alligators, yet Europeans, as a rule, call by that name all the crocodiles there, of which there are two genera and three species. Even in Government returns these destructive reptiles are called by one or other name indifferently, and often both names will be found in the same document. It may be as well to start with a good sweeping statement, which, so far as present knowledge goes, may be taken as correct. It is this: except in China, where, in 1869, an alligator (*A. sinensis*) was discovered, or rather discriminated, there are no alligators either in Asia, Africa, or Australia'. He then goes on to explain the main differences between Crocodiles and Alligators and, after a description of the Fish-eating Crocodile, the Gavial, refers to the differences between the marsh or tank or inland river crocodile *C. palustris* and the estuary or salt water crocodile, which is also an inhabitant of North Eastern Australia and has been met with far out at sea, *C. porosus*. This is the crocodile of the Sunderbunds—a ferocious beast who likes human beings for food as much as *C. palustris* likes the dog. *C. porosus* is recognised as the largest crocodile in the world. It is somewhat surprising therefore to read that '*C. palustris* grows to a length of 29 ft. 6 in., that being the record of one killed by Mr. Brunton at Cochin on the western coast. The length of the head of this monster (which is preserved at Cochin) was no less than 2 ft. 8¾ in. In an ordinary way a 12 ft. specimen is large and a 15 ft. specimen looks enormous, so that Mr. Brunton's specimen is abnormally long for this species.' *C. palustris* lays its eggs in the sand, and does not make a nest. *C. porosus* makes a nest, composed of weeds, the fermentation of which gives heat enough to hatch the eggs.

In Volume XXXIV the Curator of the Sarawak Museum gave the dimensions of some 41 Estuarine crocodiles, the largest of which was 16 ft. 6 in. From these measurements he deduced that *C. porosus* is a little more than seven times as long as its own head, so that a skull 39 in. long would belong to a 23 ft.

beast, and 'thirty foot "Crocs"—like thirty foot python—have still to be measured, at any rate in Sarawak'.

In Volume XXX Major C. R. S. Pitman, now Game Warden in Uganda and a much appreciated contributor to our Journal, referred to an article he had recently written for *Blackwood's Magazine* in which a correspondent in Fyzabad in 1920 gave instances of Gahrials, *G. gangeticus,* having attained a length of 19 ft. to 21 ft. 6 in. The editors of our Journal in a comment on Major Pitman's note stated that there was on record a specimen of the Estuarine crocodile, *C. porosus,* 33 ft. in length—'*but doubts have been cast on the correctness of this* measurement.'

The Cheetah or Hunting Leopard.

Major G. S. Rodon—late of the Royal Scots—contributes two excellent photos and an article on the young of the Hunting Leopard (*Cynaelurus jubatus*). Perhaps the main interest of the paper at the present day is the record that the Cheetah was breeding in the Berars in 1896. How long is it since it has been seen there?

We find no further reference to the Hunting Leopard until August 1919. In Volume XXVI there is a note by Mr. G. O. Allen, I.C.S., recording that a Hunting Leopard (*Cynaelurus jubatus*) had been killed in 1916 by villagers about 30 miles south of Mirzapur in the U. P. Mr. Allen wrote: 'I think about five have been obtained in the last 25 years, one being shot while it was in the act of stalking a sambhar. The one whose skin I saw had been killed in the neighbourhood of a grassy plain which held some Black Buck'.

The then editors of the Journal (Messrs. Millard, Kinnear and Spence) added a footnote:

[Mr. Allen's note on the hunting leopard is most interesting as very little is known about the distribution of this animal in India. The distribution of the hunting leopard in India, according to the latest books on Natural History is not correct and we would urge members to send in any information they have on the subject. Notes on old and recent records of hunting leopards would be most valuable. We have been for sometime collecting old records and hope shortly to publish them. It is advisable when writing of this animal to call it the hunting leopard and not the cheetah, a name used in many parts for the leopard or panther, *Felis pardus*].

As a result Lt.-Col. Fenton, who contributed very interesting notes on the Lion in India, wrote on the Hunting Leopard in Kathiawar in Volume XXVII, and stated that so far as the Bombay Presidency was concerned the only district in which it occurs is in a limited area, situated about the centre of the Province of Kathiawar and there only in very small numbers. He tells us that the late Col. J. W. Watson who was a very keen observer and shikari stated that in 1884 there were not more than twenty Cheetahs (the local name panther being known as the *dipdo* or spotted one). If anything, Col. Fenton adds 'the number was overestimated by Colonel Watson, for during the succeeding 17 years, when I was serving in the Province and became intimately acquainted with a greater part of it, I only heard of nine, two of which were shot by natives, in the neighbourhood of Chotila, midway between Wadhwan and Rajkot; two by Mr. S. A. Strip of the Wadhwan Garassia School, within a few miles of the Civil Station, and the remaining five, including two which were speared respectively by Mr. Waddington of the Rajkumar College and myself, by two young officers'.

When do the eyes of the Cubs of the Wild Felidae open after birth.

Is there any definite time for Lion, Tiger, Panther and Cheetah cubs' eyes to remain closed after birth as with dogs, cats, etc.? Surgeon-Captain H. F. Cleveland of the 3rd Bombay Cavalry writes:—

'Major Rodon in his interesting article on the young of the hunting leopard which appeared in the last number of the Journal says: "Possibly, like lion cubs, they were born with their eyes open". In 1892, when shooting in Somaliland, I shot a lioness over a kill, and afterwards found her three cubs. All three had their eyes closed. On the following day two of the cubs had their eyes open, but the other one did not open its eyes till the morning of the third day. The Somalis with me said that the cubs when I found them, were nine or ten days old; but from the condition of the mother and from the appearance of the cubs, I did not think they could have been more than two or three days old.

'I wrote to several people to try and ascertain whether there was any definite time for lion cubs' eyes to remain closed after birth as with dogs, cats, etc., but could not obtain any definite information, nor was I able to find out anything from the few books on natural history in my possession. The general opinion appeared to be that lion cubs' eyes opened two or three days after birth, and it would be interesting to know whether this is a recognized fact.

'I presume the period would be the same in wild animals, as in those born in captivity!'

Vol. XII.

Fishing in Indian Waters.

New names appear in this Volume. One who wrote for, let us hope, several generations of Fishermen was F. O. Gadsden of the R. I. M. whose papers on Fishing in Indian waters should be read by every one interested in Sea Fishing. He writes of Bombay, Aden and the Andamans in this volume and commences, as he should do, with the Bahmin (*Polynemus tetradactylus*) and the Bombay Harbour. He starts almost in the vein of the writer of the British Grenadiers. You may call the Mahseer (*Barbus tor*), the Seer Fish (*Cybium khulii*), even the 'Cock-up' (*Lates calcarfer*) the Indian Salmon; but, he says, 'if there be an Indian Salmon, it is the Bahmin. Beautiful silvery scales, large, strong wide-spread tail, powerful dorsal and pectoral fins, with a most marvellously lovely sheen of flesh pink, silver and olive-green tints in his scales; he is, in fact, when just landed, "a sight and a perfect picture for sore eyes". He lives in the sea, but seems to be very fond of running up the estuaries partly for his food supply and partly, I fancy, because like his prototype the *Salmo salar,* he cannot do without just a taste of fresh or rather brackish water', and yet although this fish stands out pre-eminently as a real good sporting fish, hardly one, he tells us, out of a thousand who call themselves fishermen, has heard of the Bahmin, of the special tackle required for him, of the amount of tackle lost over him. Engineer Commander Gadsden writes 'When hooked, a bahmin is the most determined brute and will fight till the last gasp for his life; and to illustrate this trait in his character I will, with your permission, relate a true story.

'An old friend of mine a Captain F—, was out with me one day. He was a very keen angler and though the Bahmin gave him every chance, on that occasion he did not manage to creel a single fish. When he came back in the evening he was asked by a guest at dinner how it was that he had got none, and this was how he explained it. He related in the most vivid manner, and with the greatest detail, how he had struck and hooked a monster, and also how he had run him up and down for I don't know how long, and proceeded to say how, on one occasion, when he had nearly got the fish into his landing-net, the fish opened its mouth, and showed him very plainly the hook, right deeply embedded in its tongue (Bahmin, by the way, have no tongue proper), and then rushed off and cavorted about again afresh. Things however came to a pass eventually, and my friend led his fish up to the net once more, this time quite certain of victory, when according to his narrative, "hey presto!" the Bahmin opened its mouth and, showing the hook in its tongue once more, winked his left optic and, deliberately biting off his own tongue, left it on the hook for my friend to land, and swam away.

'The look of surprise on the guest's face when he heard his explanation can be better imagined than described. Whether he believed him or not I do not know, but I do not think he ever asked him again as to the cause of his non-success.'

However the volumes which contain these papers are still available and it is better that members should buy and read them than that we should quote extracts; but if strangers are ever sent to Bombay or Aden, or to the Andamans in a holiday mood, let them remember the excellent fishing provided, and turn to Gadsden for instruction.

EHA, Butterflies and Rats.

EHA, now living in Uran on the other side of the Harbour, is a continual joy. One minute he notes the approach of the monsoon by observing the flight in huge numbers of the butterfly *Euploea core* northward up the harbour. He notes some 40 days later their return coinciding with Cocoanut Day to tell the fishermen they can be about their business once more in safety. Another time he writes on rats—He tells us 'To kill rats is the duty of every good citizen of a great city like Bombay' and reminds us that we must not regard all rats as simply rats, belonging to the genus pest and lying almost outside the domain of Natural History. He catches rats and sends them to the British Museum for Mr. Oldfield Thomas to identify and is interested in the different ways in which species are constituted. He writes 'It is rather significant that in the same Museum where Mr. Thomas is classing rats by the measurements of the skull, and treating colour and outward appearance as of no account, the pillars of the entomological department are splitting our most familiar butterflies into a multiplicity of species distinguished by the brightness of a spot, or the breadth of a fascia.' This is how he finishes up his article: 'I may mention that all my eighteen rats were males. This throws a sad light on the social life of the rat. The significance of it is, I believe, that the mother has to seek remote and secluded places to bring up her family, lest their own parent should find them and eat them. Rabbit fanciers know that the buck must be kept in a separate hutch till the young are able to run about for the same reason. This trait appears to be characteristic of the *Rodentia* generally. Nearly all the squirrels that came about our houses and gardens are males.'

The Hybernation of Bears.

In the previous volume Major G. S. Rodon put up an interesting query 'Does the Brown bear hybernate?' He wrote that he had recently returned from shooting in the Himalayas 'but regret to say that I could find out nothing reliable regarding the hybernation of the Himalayan brown bear (*Ursus arctus*). Everyone, from whom I made enquiries, agreed that the Himalayan black bear (*Ursus torquatus*) does not hybernate, as these animals are frequently seen during winter round the villages, and I was told that they occasionally break into unoccupied houses to look for grain. My informants, on the other hand, all insisted that the brown bear does hybernate for five months, but none of them had ever actually found one asleep. The fact is at Chamba, where I was shooting, nearly all the villagers in the high hills leave during the early winter for lower and warmer parts, and those who stop do not go up into the mountains when once the snow has fallen, and so have no real opportunity of seeing brown bears, if these were about. I drew attention to the fact that the brown bear in captivity does not sleep during winter, and they all said "of course he does not, because he cannot get the particular herb which he always eats to send him to sleep". One of my shikaries told me that once upon a time there was a certain villager who actually saw a brown bear carrying in his mouth some herbs; he followed it a short distance to a cave, and on arriving, the bear ate up the herbs and then lay down and went to sleep. The villager then returned to the place where he first saw the bear and found a piece of the herb, which he took home and divided amongst his family. They all, including himself, ate of it and they all went to sleep and did not wake up for four months (saving money by this). The following autumn this same villager saw the same bear rooting about, and, suspecting he was getting the sleeping herb, watched him; but the bear somehow knowing and resenting this, selected this time a poisonous herb, similar in appearance to the other. This the man gathered after the bear had gone away and divided it with his family; the result being that they all died'.

He adds 'It seems to me a very strange thing, if the brown bear does hybernate for some five months every winter, that absolutely no sign of the instinct should be observable in the young of this species when captured'.

C. H. Donald answers in Volume XII Major Rodon's query—He says 'I too, in common with the natives of this district, believe that the Brown Bear (*Ursus arctus*) does hybernate, and my reasons, which may be taken for what they are worth, are the following:—After the sheep have left their summer resorts at altitudes varying from 10,000 to 13,000 feet, it is not by any means uncommon to see "Bhrubboo", as the hillmen call him, feeding on the grassy plains in the mornings and afternoons, and as for his tracks, one comes on them at every turn. Last October I was out after Bears, and in one place found the entire hillside rooted up in much the same way as if a sounder of pigs had been over it, and, as my shikari sagely remarked, "there is little use of a plough and bullocks here when Brown Bears do all that is necessary." These signs of "Bhrubboo's" presence however are only to be met with till the first week in December, or in the case of a mild winter up to about the 20th of December. If they do not hybernate, surely one would come upon fresh tracks after that date also . . . It is certainly very strange why the young in captivity should show no sign of the instinct, as Major Rodon remarks'.

Captain F. E. G. Skey, R.E., also answered Major Rodon's query. He wrote 'It may interest some members to know that I found a black bear (*Ursus torquatus*) hybernating in a hollow which the Kafirs had cut in the stem of a large deodar, about three feet from the ground, at about 7,000 feet in the Utzan Nullah, near Drosh, on the 20th January last, and shot him. He had a splendid coat, a half-inch lining of fat and an empty stomach. The drowsy way in which he twisted his head backwards and forwards in the hole when first aroused was distinctly ludicrous'.

Major Rodon, referring to this, writes in Volume XII 'As many readers of the Journal may not know the climate and country round Drosh, it is a pity that Captain Skey, in his interesting note on the Black Bear he found asleep in a tree, did not give some particulars as to whether the country was covered deep in snow, and no apparent food for bears available at the time of year he names; also what the natives of the country say about the winter sleep of the Black Bear. In Chamba the people living in villages high up, told me that the Black Bear did not sleep through the cold season like the Brown Bear, and that they saw them frequently during the winter; so when finding a Black Bear asleep during the day at that season, it is necessary to be careful to ascertain that it is not only ordinary sleep the bear is indulging in'.

Mr. C. H. Donald in a subsequent note gives convincing proof that the Brown Bear (*Ursus arctus*) does hibernate and says 'As for Black Bears (*U. torquatus*) I believe it entirely depends on where the winter finds them. Those that have gone up to higher altitudes after the Indian corn crops have been cut and are caught there by the December snows hybernate, while those that are able to make their way down to the oak forests, at about 3 or 4,000 feet above the sea-level do not hybernate, as I have seen and shot black bears below Mussoorie in January and February'.

Major Rodon replying to Mr. Donald writes 'It is to be regretted that he omitted to state whether his informant from Kulu was a European or a native; and also whether he went quite close up to the brown bear which he noticed in a hollow tree. If the bear was in a real state of hibernation it could have been touched without any danger of its awaking, for in true hibernation the body is quite cold—rigid—and with but slight sign of respiration. Of course all hill bears may be found asleep in hollow trees during the day at all times of the year, but whether they truly hibernate has yet, I think, to be proved. This special state I believe must greatly depend on the exact amount of fat they put on during the autumn, and much more on these circumstances than on the elevation they may find themselves as winter sets in' . . . . 'Black Himalayan Bears have frequently been seen and shot in mid-winter by Europeans; and the hill people of Chamba have told me that black bears usually come down to the lower valleys as winter approaches, but occasionally they have also been noticed prowling about the high situated valleys in January, sometimes breaking their way into houses in search of grain' . . . . 'The Brown Bear of Russia does not truly hibernate during the winter, although the cold is intense and the whole country is deep in snow. The bears remain often for a long time sleeping in brushwood shelters, from which they move out now and then in search of food. While dozing in the shelter very little noise disturbs them; on the other hand the black bear of North America can scarcely be roused from his torpid condition during winter, which points to a true state of hibernation in his case'.

The Game Birds of India by E. W. Oates, Vol. II.

Does a review help the sale of a book? or What is a good review? is a problem the solution of which is not always easy; for proof read the review in the 2nd volume of Mr. Oates's *Manual of the Game Birds of India.* The review starts off 'Knowledge so extensive and accurate as Mr. Oates's knowledge of Indian ornithology often unfits a man for the work of helping beginners and smatterers, but *The Game Birds of India* shows that Mr. Oates can be popular as well as scientific. It is in almost every respect a model of what a popular *vade mecum* should be. Technical terms and technical matter alike are absent, and even those detailed descriptions which are apt to be more irksome than helpful to the ordinary reader are successfully dispensed with'.

How the ordinary small game shikari must have revelled reading about the Ducks and Geese which fill four-fifths of the Volume. What orders must have poured into the publishers, A. J. Combridge & Co., Bombay. And yet with what a slating does the review end! 'Where so much is excellent it is unpleasant to find fault, but there is what we cannot help characterising as an inexcusable fault in this book, and it springs from Mr. Oates's unbridled originality. He has attained a position in his subject which entitles him to be original and his views will always command respect; but there is a time and a place for everything, and a little reflection ought surely to have convinced him that this book did not offer a suitable occasion for innovation. It is not addressed to specialists in ornithology, but to intelligent sportsmen who like to identify the birds they shoot. Those who wish to do more than this are recommended by Mr. Oates himself, in the Introduction, to study Dr. Blanford's volume in *The Fauna of British India.* Then how did he fail to see the propriety of sinking his personal opinions and following the nomenclature and arrangement adopted by Dr. Blanford, whose book, whether we agree with it in all points or not, must, for years to come, be the text-book of all ornithologists in India? Of the forty-three species in this little volume, no less than ten appear under names different from those given to them in *The Fauna of British India.* Even the trivial English names to which we have all got accustomed are changed to suit Mr. Oates's personal notions. The Mallard is the Wild Duck, the Whistling Teal, the Small Whistling Duck, and so on. But the worst example is the Spotted-billed Duck, which is put by Blanford as by all previous writers, into the genus *Anas*, with the Mallard. Mr. Oates separates it altogether, brackets it with Hume's Oceanic Teal (which he calls The Andaman Duck) and invents a new genus for the accommodation of these two. But in his group of True Ducks he includes, with the Mallard, such dissimilar birds as the common Teal, the Pintail and even the Shoveller'.

For thirty years and more readers of books on Indian Birds have complained of those who departed from Blanford's nomenclature and the 'old-uns', even when the reason for and the necessity of the change is explained in language which he who runs may read, are, many of them, still dissatisfied.

Bears killed and eaten by Tigers.

Mr. A. L. Butler puts on record the following note on the subject:

'It is well known that tigers will attack and eat bears on occasion; both Blanford and Sterndale give instances, while in Vol. IX of the Society's Journal may be found two earlier records by Mr. T. J. Campbell (p. 101) and Mr. P. H. Clutterbuck (p. 229). It may be worth while to note one more such occurrence. Mr. C. E. Spooner, State Engineer, Selangor, tells me that when shooting in Perak, about a month ago, he came upon the body of a full-grown Malay bear which had been killed and half eaten by a tiger. The latter was disturbed at the carcase, and made off with a loud "woof!" escaping unseen. The whole of the bear's hind quarters upto the middle of the body had been devoured, giving the beast the appearance of having been roughly cut in two'.

Vol. XIII.

Sport in Northern Guzerat.

Deesa in northern Guzerat is no longer a cantonment but its climate and Natural History are similar to many other places in India. Capt. C. G. Nurse of the 13th Bombay Infantry writes of it as a delightfully sunny spot and goes on 'During the months of December, January and February only is the climate pleasant; in the hot weather, i.e. from March to June, and again in October and November, one is baked, and during the rains one is boiled. But, hot as it is, I personally much prefer the dry heat, which rises sometimes during the hot weather to 120°, to the moist and enervating climate of Bombay. The life has some compensations. There is small game shooting of some kind or other during most of the year, the country round is admirable for riding, and there is big game shooting to be obtained within reasonable distance'. He certainly knew how to find good sport. He reminds us by the by that the last Indian lion in the neighbourhood was shot in 1878.

A Shooting Expedition on the Pamirs.

Only a day or two ago a young officer called on us and asked for information and help as regards his intended shooting trip to the Pamirs. There are several papers of great interest on this subject in the Journal. The first was read before the Society on the 18th July 1895 and was from the pen of a distinguished visitor to India, Baron Edmond de Poncins, who wrote on shooting *Ovis poli* on the Pamirs. The article will be found in Volume X.

Ovis poli.

The last two paragraphs of the Baron's paper may be quoted: 'When stalking these animals the golden rule of never approaching from below but always from above is of great importance. They do not mind going up or down-hill[1] and will cross a valley of more than a mile in breadth when disturbed. When shot at much they go off great distances and leave the country. I do not consider that they are hard to kill considering their size. A 500 express is quite enough for them. Mine was a double barrel 500 magnum, shooting five drams of powder and a hollow bullet about one inch long. I found it was capital weapon for *Ovis poli* and other game. Some sportsmen and naturalists have tried to make out that there are numerous species of these giant sheep, but I am strongly of opinion that in Central Asia there are only two species, viz., the *Ovis poli* and the *Ovis ammon*'. *Ovis poli* is now regarded as a variety of *Ovis ammon*.

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[1] Some mountain game when disturbed go up-hill, but the *Ovis* does not. What they do is to get out of the way by the easiest road.

The second paper on hunting *Ovis poli* we think of appeared in this Volume as a reprint from an article in the *Field*.

The next article of importance on *Ovis poli* was contributed in Volume XVIII by Col. G. D. F. Sulivan, late 4th D. G. Apart from the useful information he gives, the gist of Col. Sulivan's article is that by studying with a telescope from varying distances dead heads of varying sizes he did not make the mistake which inexperienced shots are encouraged by their shikaris to make of shooting rams with horns measuring less than 60 inches.

Col. Sulivan ends up:—'It will be seen by the foregoing notes that, though small rams abound on the Taghdumbash, big ones are very few and far between, and this, I feel convinced, is partly, if not greatly, owing to the indiscriminate slaughter of immature heads, by British sportsmen, that takes place every summer. Whenever I came across a ram of about 58, the Kirghiz with me, while saying he knew it was not big enough for me, used invariably to assure me that any other Sahib would be very pleased with a head of that size, and would shoot all that he could, and no doubt they only said the sad truth. I could forgive a man shooting a head of this sort towards the end of his trip, if he had failed to find a good one, but to go on shooting ram after ram, all with immature heads, is wicked, and those who do it are simply depriving some sportsmen in the near future of the chance of getting trophies worth having, while they take away a number of heads, it is true, but not one that is really typical of a full-grown specimen of this magnificent sheep. Two sportsmen a few years ago shot 11 rams in 8 days, only two of which, the Kirghiz who was with them told me, were at all good, a record of slaughter in so short a time probably, but hardly one to be proud of, but some men seem imbued with a regular lust for killing. In hopes of guiding sportsmen in the future into better ways, I append the following:—

Classification of Horns.

Good	60 to 64 inches
Very good	over 64 to 68 inches

and anything over the latter is of course very much of the superlative order: the record is 75, as given in Mr. Rowland Ward's *Record of Big Game*. In conclusion, let me beg sportsmen to remember that "quality" comes before "quantity", and that therefore one good head is better than any number of indifferent ones'.

The advice Col. Sulivan gave is as good today as it was then and we strongly recommend any one intending to visit the Pamirs to read these four papers in full before preparing plans etc.

In the early part of 1927 William J. Morden, Field Associate in Mammalogy, American Museum of Natural History, New York City accompanied by James L. Clark, Assistant Director of the Museum were on an expedition to the Pamirs and Central Asia with the primary object of collecting a series of Great Pamir Sheep (*Ovis poli*) for exhibition and study purposes. Mr. Morden's illustrated article will be found in Part I of Volume XXXIV. He confirms what Col. Sulivan says. He writes: 'Local Shikaris cannot be relied upon to judge the size of *Ovis poli* horns, for to them, as to the usual native shikari, every head is "the best head".'

How to distinguish 'Kills' by Carnivorous Animals.

W. A. Wallinger, then D. F. O., Dharwar, writes: 'Most men who have gone in for large game shooting at all extensively in India learn—as indeed they should—to distinguish more or less readily between a "kill" by a panther or a tiger, and one directly attributable to other carnivora, such as hyaenas, wolves, wild dogs, etc. The distinctive features are usually pronounced and unmistakable'. He then gives certain '*Maxims regulating Panther "Kills"*,' writes on the '*Distinction between Tiger and Panther "Kills"*,' of 'Unusual Kills', and of the '*Applicability of the Maxims to Tigers*' and then to *Hyaenas, Wild Dogs* and *Wolves*, and ends up with '*The Diagnosis of Panther Kills*'.

A visit to the 'Null' after the famine of 1900.

The famine of 1900—particularly in Guzerat—and the way Lord Curzon dealt with it will be remembered by many. It is said that despite the care and the money lavished personally by Lord Northcote, then Governor of Bombay, the Cattle for which Guzerat is famous have never recovered from it.

Reginald Gilbert comments on how various aquatic birds normally our winter visitors, absented themselves from the Null the winter after the famine. First of all, however, he describes the Null, and as few people now-a-days seem to remember or know that Western India is fortunate in having this 'delightful home for visitors' we will quote his description.

'The Null is a large inland lake between Gujerat and Kathiawar, extending for about fifteen miles, and being about four miles across. It is of no great depth, and the water contains quantities of weeds on which wild fowl feed. There are large tracts of rushes in it, and the shores around and the numerous islands are covered in a great part with high rushes. It is the winter home of countless numbers of birds, geese, snipe, flamingoes, pelicans, coots, and other waterfowl. Snipe are generally there in large wisps, and, strange to say, are always wild there. Duck, too, are also very wild, and a large bag is seldom made there although they are so numerous. Last year (the famine year) the Null was absolutely dry and, of course, no wildfowl stayed there.' 'I was curious to know what would happen this year and whether the duck, etc. would return to their old haunts. Although the rainfall was deficient around the Null this year, the Null had quite the average amount of water in it. The water runs into it from various small streams, and I believe that the river at Wadhwan flows into it. There is no outlet.' 'Large herds of buffaloes with their attendants go to the Null, usually in the cold weather. The buffaloes find good food in the rushes, and large quantities of ghee are produced here. It was lamentable to find that all these had died with the exception of one small herd on one island. The villages around presented a sad appearance—the greater number of houses in ruins, and from half to two-third of the people dead. A mild famine exists again this year, as they had again a scanty rainfall, and few of the fields were tilled. Strange to say, I saw more bullocks than I expected. From all over the Bombay Presidency I hear duck, snipe and waterfowl have not visited us this year. I suppose there can be no question that this is because last year they came as usual and found no water. Having learnt that lesson they thought it was useless to come again; but can birds think, that is another question.'

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Wild animals at water.

R. G. Burton contributes (irritating man ! 'via the ***Field***') a paper on this interesting subject, and refers to the opinions of Blanford, of Sterndale and of Lydekker as regards the Sambur (he is particular as to spelling !). He differs from his old friend Sterndale holding that this deer visits water once every twenty-four hours, usually by night. He states from long personal experience, and contrary to Lydekker's opinion, that Nilghai drink daily—sometimes in the evening sometimes at night. Mr. Blanford believed that the Indian Gazelle never drank but R. G. has a photo of them drinking. He ends up 'No doubt there are deserts in Sind and Bikaner where animals go for considerable periods without water. But the results of my observation convince me that where water is obtainable all animals in India drink every day'.

Birds of Prey.

C. H. Donald, now of Egerton Hall, Dharmsala Cantt., Kangra District, Punjab, who has made the Accipitrine birds his special study, writes under date of July 1901 to answer a query made by Major Rodon as to what becomes of the bones of birds after they have been struck by hawks, and whether a hawk eats his prey where he struck it or carries it away elsewhere. Mr. Donald answers the second question first. He writes: 'It depends entirely on the locality, in which the hawk has struck, as to whether it will attempt to eat its quarry where it has caught it. If the place is well wooded, or otherwise offers good cover, for the hawk to sit and enjoy its meal in peace, it will pluck and devour it there and then, but very few will attempt it in the open, where the keen eyes of their bigger cousins, are liable to see. A peregrine may, sometimes, be seen on an open plain, or on the bed of a river, eating its prey, but in that case, it has probably caught a duck and more than it can conveniently carry, or it finds, that, by flying across an open plain, with a bird in its talons, it is much more liable to be seen by one of the large sea-eagles, always to be found in such localities, than if it remained where it killed. Of course a hawk may occasionally be seen having its meal in the open, but it is the exception. As to what becomes of the bones is a question which must be answered by first taking into consideration the different kinds of hawks and what is most likely to be the extent of their prey, for all hawks, in their wild state prefer tackling something considerably smaller than themselves, with the exception of the peregrine (*F. communis*) and some of the Himalayan Eagles, but we will come to them later on. A hawk's digestion is nothing short of marvellous and all ordinary bones that it can break with its beak, it swallows together with the feathers and they seem to rather agree with it than otherwise. The feathers are expectorated every morning in a ball before the hawk goes out to search for its morning meal'. This article is another of those many articles which want reading at the present day, and any one who is interested in the training of hawks and the noble sport of Falconry cannot do better than go through the general indexes of our Journal and read all that Mr. Donald writes on this fascinating subject.

Fryer's Travels.

We are digging out from old Journals Natural History notes by those who have been with us during the past fifty years. What about those who lived and took an interest in Natural History two hundred and fifty years ago. Sir Norman Macleod tells us of one Dr. John Fryer whose Travels through India and Persia in the latter part of the seventeenth century have interested many in India. He left England on the 9th December 1672—gave Ceylon a wide berth because it then belonged to the Dutch with whom we were at war, anchored at Machlipatam in the kingdom of Golconda in June 1673 and then sailed to Madras. 'In September Fryer left Madras, sailing round Ceylon and up the Malabar Coast, where in obscure weather he tells us they were warned by water snakes of their too near approach to the land'. (There is still a stretch of sea one traverses between Bombay and Colombo which at certain seasons seems to be a mass of Sea Snakes). A year after leaving England, Fryer landed in Bombay and was received by the Honourable Gerald Aungier, Governor, both for the King and the Company, and President of all the East Indies. An interesting description of Bombay follows, from which it may be gathered that Colaba was then called Old Woman's Island, low and barren, of no other profit but to keep the Company's antelopes, and other beasts of Delight. A visit was paid to Bandora, then in possession of the Portuguese, whence Fryer and his party travelled all over the Island of Salsette or Canorein. Outside Bandora they used their fowling pieces all the way being presented with rich game, as Peacocks, Doves and Pigeons, Chitrels or Spotted Deer, and close to the ruined City of Canorein they passed through a wood peopled by apes, tigers, wild buffaloes and jackals, also flocks of parocket. As the hot weather approached our author was led to moralise on the ingenuity of the Weaver Bird. 'In the meanwhile nature affords us a pleasant spectacle for the season, as well as matter for admiration, whereby I know not why we should deny reason wholly to animals, unless if it be man having so much, they seem comparatively to have none. For here is a bird (having its name from the tree it chooses for its sanctuary, the toddy tree) that is not only exquisitely curious in the artificial Composure of its nest with hay, but furnished with devices and Stratagems to secure itself and young ones from its deadly enemy the Squirrel, as likewise from the injury of the weather, which, being unable to oppose, it eludes with this artifice, contriving the nest like a steeple-hive with winding menders, before which hangs a panthose for the rain to pass tying it by so slender a thread to the bough of the tree, that the Squirrel dare not venture his body though his mouth water at the eggs and prey within, yet it is strong enough to bear the hanging habitation of the ingenious contriver, free from all the assaults of its antagonists, and all the accidents of gusts and storms, hundreds of these pendulous Nests may be seen on these trees'. But here again the note must be read in full to be appreciated. Fryer writes on animals differing as widely as the Rhinoceros and the Ass, and as to whether the Rhinoceros be the Unicorn writes 'I suspend my belief, since I have seen a Horn turned with Furrows and Ridges from the Basis to the point and tapering like that of our King's Arms.'

Tiger netting in Mysore.

S. M. Fraser, writing from the Residency at Bangalore, tells us of Tiger netting in Mysore and says 'it is probable that, in spite of what Sanderson and others have written, there is still a good deal of misconception about tiger netting, as pursued in Mysore, which is a genuine native sport, well worth witnessing by any one interested in wild beasts and their ways.' He concludes his paper 'Any one who has been present, whether the young sportsman who wishes to become familiar with the sight of an angry tiger, or the old shikari who has slain the beast by the usual methods, will equally agree that Tiger netting in Mysore is an interesting experience, and well-worth witnessing.'

The King Cobra.

We have already referred to the King Cobra which was kept alive for some two years in the Society's Old Museum. Vety. Captain G. H. Evans who knew something about elephants also knew something about Hamadryards in their native haunts. He starts his paper thus 'The Hamadryard is at least by its notoriously evil reputation known to a large number of our readers, and having seen something of this reptile, it occurred to me that a paper on the subject might prove of some interest'. With regard to the Snake's aggressiveness he gives several travellers' tales—several true tales—and writes 'Mr. Hauxwell in a note to me, added "I do not believe in the aggressiveness with which this snake is credited. He will, like anything else, make every effort to defend himself when cornered, but will, in nine cases out of ten, prefer to make off and save his own skin." My experience is quite in accord with that of the above named gentleman, viz., that it is unusual for them to be aggressive. I consider their evil propensities have been greatly exaggerated. Their large size, activity, fierce appearance when irritated, readiness to attack on slight, and at times seemingly without, provocation, have undoubtedly tended to earn for them a bad character. There is, however, no denying that empty-handed, an infuriated Hamadryad is about as nasty a creature as one could possibly be brought in contact with'. Those who knew Captain (Col.) Evans in the flesh will agree with him that he was not of the build of a 100 yards Running Blue—He writes 'For my own part I have no pretensions to being fleet of foot, but if ever I have been near breaking the record for 100 yards (I regret I cannot give the time), it was on an occasion when a Hamadryad turned his attentions to me. The snake was moving along rather fast through grass, and having caught a glimpse of his size, I concluded it was a python; so taking a stick from the hand of a friend, I ran after him, only to soon have the tables turned, for as I approached he suddenly stopped, turned, and raised his head and neck. I at once perceived my mistake, took advantage of the start, and what is more, to my surprise, intense relief and astonishment of my friend, maintained my distance throughout the race. My friend who had never before heard of a Hamadryad, and enjoyed what he described as the fun, stated with evident disappointment that the snake had only followed some twenty or thirty yards; as I never troubled to look behind till I came up to him, I accepted the statement.'

'As regards aggressiveness, however, Mr. W. Raby-Noble writing in July 1903 from Assam records how a 10 foot King Cobra made an unprovoked attack on a cooly woman in a tea garden seizing her by the leg and hanging on but not attempting to wind round her body. The woman was absolutely paralyzed with fear, and apparently did nothing to try and free herself. The other cooly women who were plucking the same plot of tea at once went off to get help, but it was not until some cooly men arrived on the scene that the snake released its hold and made off. The men gave chase and managed to kill it, and they assert that when pressed the snake attacked them.'

The woman despite prompt measures taken by the Babu Doctor died in 20 minutes—the symptoms were: much pain and swelling of part bitten, vomiting, difficulty in breathing, total prostration, and then death.

A big Sword Fish.

Is the Saw Fish which uses its weapon as a rake to gather its food a comparatively harmless monster? The Sword Fish *Histiophorus sp.* is generally credited with ferocity and a desire to attack whales or anything big which gets in its way. The following certainly shows that the Sword Fish in its pugnacity is unreasoning.

Capt. F. A. Smith, I.M.S., sent us in 1902 the broken off sword of a *Histiophorus* which including 2¼ inches of the upper jaw was 24½ inches long and 9 inches in circumference at the base. Its history was as follows:—'In February 1902 an Arab buggalow belonging to Muscat was on its way there from Cutch. A few days out it struck something on the port bow which the Nakodar thought was a rock. The craft was shaken up from stem to stern, and after a few seconds those on board heard a loud report and she was free again.

'She was making some water in the bows and the cargo lying there was shifted when this object was found sticking through the planks and firmly fixed, the leak was closed up and the buggalow reached Muscat safely. There I examined her and the owner presented me with the sword which had pierced a teak plank some 5 inches thick. The fish had freed itself at the expense of its weapon'.

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Trout and other Fish; and Fishing in Ceylon.

A paper by R. A. G. Festing, reproduced from the *Fishing Gazette* of the 7th January 1905, tells us something about Fishing in Ceylon. 'The first experiments in Trout breeding were made in 1880 by the late Mr. H. L. Hubbard. In 1882 a few fish were turned into the stream at Nuwara Eliya, and ova have been more or less regularly imported since 1886. When the Ceylon Fishing Club was started I do not know. At first the ova of Brown Trout and Loch Levens only were imported; but in 1889 the ova of rainbow trout were introduced. The experiment proved successful, the rainbows taking kindly to the Ceylon streams, and they are now far more popular than the brown trout on account of their superior sporting and edible qualities.

The Making of a Himalayan Trout Water.

In Volume XXIV, published in January 1916, Mr. G. C. L. Howell, then Director of Fisheries, Punjab, wrote an account of the introduction of the Brown Trout into the head waters of the Beás River: 'The indigenous fish in this river above Sultanpur are two only—Mountain Barbel (*Oreinus sinuatus*) and a small Siluroid or Catfish (*Glyptosternum straitum*). They are known locally as "Gunguli" and "Mochi" (Cobbler) respectively, and the "cobbler" is not sufficiently common to be important. With the barbel it is otherwise. The barbel seem to spawn nearly continuously from March to October, and though the bigger fish—they run up to 3 lb. or so in weight—drop downstream to the neighbourhood of Sultanpur in winter, the warmer brooks and runners hold fry all the year round. The fecundity of the barbel is the supremely important fact *par excellence* in connection with trout in the Beás. In the Nilgheries, for instance, acclimatised trout tend to increase faster than their food supply; in many New Zealand rivers the same trouble occurs: but in the Beás there is no danger of the barbel being eaten down, and they undoubtedly form one of the staple foods of our *Salmo fario.*'

As regards other indigenous fauna Mr. Howell writes 'But even if the Barbel disappeared, it is most improbable that the food supply would ever give out. To my mind, and speaking as an enthusiastic fisher, it is a moot point whether "bughunting" in the Beás waters will not be as much fun as angling—so rich is the field for observation. The small deer of the river have never been properly worked out, but the bottles of specimens, which accompany this paper and which (again) the good nature of our Secretary may induce him to delineate, give some idea of the wealth of life to be found. Most important of all is a small species of Water Flea (Daphnia) with a long tail, which attaches its shell to the rocks in the coldest glacial torrents. Snails[1] (*Planorbis* and *Limnaea*) are common. Crabs[2] (*Potonon kuluense*) are found in every marshy spring: the water-cress beds hold a beautiful little clam (*Unionid*) not yet identified. We have found "bloodworms" (*Chironomus?*). Leeches—a valuable mountain trout food—are under nearly every stone in the river.'

Mr. Howell commenced his paper by saying 'it should have been written by Mr. Frank Mitchell whose work in Kashmir has been of much longer duration and on a far bigger scale than our efforts in the Punjab. But he, the Editor tells me, declines to write. Perhaps the mistakes in this paper will fire him with the determination to correct his pupil.'

Trout in Kashmir.

Mr. F. J. Mitchell was 'slow to write' though in the same number of the Journal a photo sent by him was published of a hen Brown Trout, *Salmo fario,* which was the biggest hen fish they had ever had in the ponds at Harwan, near Srinagar, and which when it died weighed 16 lb. 1 oz. 'Probably it was the mother of some of the first ova that went to Kulu when trout were introduced into the Punjab from Kashmir.'

In December 1917 Mr. Mitchell wrote a note for us (Vol. XXV) on the flies for Trout Fly fishing in Kashmir. In 1918 Mr. Mitchell wrote for us an account of 'How Trout were introduced into Kashmir'. The year was 1900 and Fly Fishers are indebted to the Duke of Bedford for sending out the first ova from Howietown in Scotland. Sir Louis Dane, then Resident in Kashmir, dropped the first artificial fly on the stock pond at Panchgam. Mr. Mitchell writes 'The great flood of 1903 swept over the land on the 24th of July and the spot on which the trout had been landed was three feet under its waters. The trout enjoyed the flood thoroughly and when it was over the subsiding water found them settled in the holes and pools they had found most to their taste. Not one remained in the ponds. The spawning season was at hand, the redds (a common term for the gravelly shallow in which trout and salmon spawn) had been thoroughly cleaned by the flood and the trout had located themselves so as to have easy access to them. I suggested that they should not be disturbed as the opportunity was favourable for them to show what they could do in the way of reproducing their species under natural conditions and with this the new Resident Mr. (afterwards Sir Elliot) Colvin agreed. At the suggestion of the Durbar the new ponds were made at Harwan outside the Rukh and another consignment of ova from England was arranged for to stock them.'

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[1] In Kulu 'Sarpanda'.

[2] Sakra.

'The policy of leaving the trout undisturbed in the stream was amply justified when the snow water had run off in the summer of 1904. Little troutlets were found in the streams below the reservoir when the water was cut off and subsequent investigation above the reservoir showed their presence in nearly every pool below Panchgam in more or less numbers. Earlier in the year the new ponds at Harwan were begun and were made of a much more permanent character than those destroyed by the flood. Three were considered sufficient for the first year—two being required for the fresh importation and one for some 200 small trout which had remained in a spring-fed pond at Panchgam when all the bigger fish hatched from an importation of ova in 1902, which had not been very successful, had been transferred to the larger ponds only to be lost in the flood. When these were transferred to their new quarters in July 1904 the largest probably did not exceed 6 oz. in weight, but with more room and more food they at once began to grow amazingly. So much so that when Lord Minto visited Kashmir in October 1906 a trout of 12½ lb. in weight was supplied from this lot as a special delicacy for his entertainment. This fish had increased its size quite 25 times in 27 months.'

Trout Culture on the Nilgiris.

In July 1921, in Volume XXVII, the Editors published a paper on Trout Culture in the Nilgiris, the joint production of Col. Molesworth, C.I.E., C.B.E., V.H.S: and Mr. J. F. Bryant, I.C.S. then Collector of the Nilgiris. As regards the streams of the Nilgiris they wrote:—

'About the year 1867, Mr. M'Ivor imported fry from Scotland. In 1869, he transferred them to ponds in the Government House Gardens. From there, they were distributed to the Ootacamund Lake, the Khundahs and other places. Mr. M'Ivor was at that time Superintendent of the Cinchona Plantations. He was also charged with the care of the Government House Gardens. His activities centred in Ootacamund. It was there that Dr. Day and he located the earliest trout ponds and the hatchery. He clung to the relatively high slopes of Snowdon and Dodabetta. He demanded low temperatures rather than an equable climate. He established a tradition which for forty years made successful trout-breeding impossible. There were no long stretches of clean gravel in the streams. Contamination by sewage or cultivation was the rule rather than the exception. A large percentage of the population were poachers by instinct. At the present day it is doubtful whether there is a single trout in the Burnfoot or Lovedale Lakes, the Sandy Nullah Stream or the Marlimund, Dodabetta and Tiger Hill Reservoirs.'

'In 1877, Mr. Wapshare and Mr. Hubert Knox put into the Pykara some carp caught in the Ouchterlony Valley in the Wynaad. In 1879, Mr. Barlow, the Commissioner, reported that the Pykara had been stocked with Mahseer (sic). When and by whom it was stocked, he does not say. These experimental measures were disastrous from the point of view of trout-culture. The myriads of carp in the Pykara River at the present day are too shy to be of much use to the angler. Competing as they do for the food in the river, they make it difficult for other fish to eke out a precarious living. Twelve miles of fine water from the junction of the Mukerti and Krurmund to the Pykara Waterfalls were completely spoiled.'

Then follows a history of unsuccessful effort by amateurs, but 'In the autumn of 1906, the Nilgiri Game Association suggested that the services of a pisciculturist be obtained, and Sir Arthur Lawley, the then Governor of Madras, was approached. The suggestion was approved. From this time forward, trout culture ceased to be a private enterprise. Government took up the matter in earnest. Sir A. Lawley wrote to the Government of Ceylon. The services of the late Mr. H. C. Wilson were obtained. He arrived in Ootacamund in the autumn of 1906. Very soon he placed trout culture on a scientific basis. The Expert had replaced the amateur. An up-to-date hatchery was built at the Avalanche 13½ miles south-west of Ootacamund. This hatchery has proved a vast success. Both imported ova of *S. irridens* and stock fish have been successfully reared here and their fry distributed to all parts of the Niligirs.' 'It had been found useless to import ova of *S. fario* into the Nilgiris as owing to the relatively high temperature of the water, these fish will not breed although they develop well. It was Mr. Wilson who first emphasised the fact that the females spawned at one time whilst the males milted at another.'

'In 1909, however, Mr. Wilson obtained ova of *S. irridens* from the Auckland Acclimatization Society in New Zealand. Most of these were successfully hatched out, and it is from them and the twenty-seven yearlings from Ceylon (and possibly from the survivors of previous experiments) that the bulk of the fish on the Nilgiris are supposed to be descended.'

As regards Brown Trout the authors write 'Despite forty years of failure, there are still a few enthusiasts who seriously advocate the importance of brown trout. They argue that even if it does not breed well, it makes an excellent cross. They point to dark specimens of pure Rainbow trout in proof of their assertions. The fact that some Rainbows fight better than others is with them a further proof of interbreeding. They are unable, however, to produce a single trout with red spots. They seem to be unaware that in the opinion of many Experts *S. irridens* fights better than *S. fario*. They ignore the fact that the foundation of Mr. Wilson's success was that he threw over *S. fario* once for all and pinned his faith to *S. irridens*. They forget that even Rainbow do not always thrive, the secret of Mr. Wilson's success being that he imported stock fish which had been acclimatised in New Zealand and Ceylon respectively.'

Rhinoceros in Burma.

In 1932 Mr. A. S. Vernay made a special journey to Malaya to obtain specimens of the lesser one-horned Rhinoceros (*R. sondaicus*) which was believed to be almost extinct. Mr. Shortridge obtained an example of the two-horned Rhinoceros (*R. sumatrensis*) for the Society in Tenasserim. Vety. Major G. H. Evans told us something about *R. sondaicus* and *R. sumatrensis* in 1905. He writes 'There are in Burma two species for certain, viz., the larger and single-horned variety of the Burmans, *R. sondaicus,* Kyan-hsin or Pyan-hsin (*Elephant-rhinoceros*) and the lesser double-horned, *R. sumatrensis,* Kyan. On the authority of the late Dr. Mason, Kyan is the generic term in Burma for a rhinoceros, signifying "to be firm in structure and mind". They are known to the Karens as Ta-do or Ta-do-khaw, and to the Shans as Sawon.'

'Both species may occasionally be met with inhabiting the same stretch of country and visiting the same pools or wallows. Burmans and Karens, as a rule, with the exception perhaps of the hunters, are much afraid of these animals, and this is perhaps not to be wondered at if we bear in mind the very ferocious character attributed to them. They are said to attack human beings without provocation, and to be most vindictive and persevering in their pursuit of the object of their anger; they do not fear elephants or tigers. Furthermore they are credited with not only stamping out but even devouring fire, and rushing in the direction of any noise they may hear. A record such as above should inspire awe in anyone believing the stories. I cannot learn anything as to how the idea of their distaste for fire arose; it is certain, however, that it is a story very generally accepted by the Burmans. That they are unsuccessful in keeping down forest fires about their haunts would by these people be attributed to the fact of their numerical weakness. Burmese and Karen hunters, who in days gone by had some experience in hunting rhino, appear to be unanimous in considering them dangerous animals, and especially so when wounded. This has also been the experience of two or three Europeans over here.' 'During the past twenty years at least, and in spite of most guns having been withdrawn, I do not think anyone in the province would consider either species abundant or common, or even moderately so anywhere. If they are still so it must be in tracts most inaccessible and little visited by Europeans. It is probable that, confining themselves as they often do to localized areas, four to six animals or even a couple wandering over such, by crossing and recrossing, would make numerous tracks in many directions and this, taken in conjunction with the fact that in such areas, pools and wallows would be met with which they had entered, might without due consideration lead to the impression that rhinoceros are abundant'. 'During a residence of several years I can only recollect some eight or nine specimens of *R. sumatrensis* and two of *R. sondaicus* being shot by European sportsmen'. 'Perhaps the most interesting feature about these creatures is the astounding way in which they ascend and descend the steepest of hill-sides. In fact the steeper the gradient the more it would appear to appeal to them. As for many of the descents into the beds of streams, they are quite in the nature of slides. For a human being, certainly, a leather seat would be of greater help to him than anything else. It is equally surprising how they ever manage to climb over some of the rocky places one meets with, yet they do. They are the most difficult animals I have ever attempted to follow. I thought serow and goral quite bad enough, but rhinoceros, I think, can give them points.' 'The only sound I have heard is a kind of grunt or rather a short harsh blowing sound. I heard one, a *sondaicus,* emit this noise when evidently surprised in cover. He heard us and had not got the wind. On being hit, unless killed outright, they usually grunt, and also do so while charging.' 'I have heard it said and believe it is recorded that rhinoceros cannot swim. In common with many popular ideas it is a pure fallacy. They swim well, crossing rivers, etc., when they desire to do so. I remember an instance in which one was killed while crossing the Tenasserim.'

Vol. XVII.

Estuary Fishing in the Konkan, and Its Decadence as an Industry.

The Society from its early days interested itself in the development of the Fisheries of the Bombay Presidency. The various papers and reports which appeared from time to time in the Journal reflect the various efforts that have been made for the improvement of the local Fishing Industry.

On the 4th October 1906, Mr. W. A. Wallinger of the Forest Service read an article at a meeting of members on 'Estuary Fishing in the Konkan' with some remarks on its decadence as an Industry. The article was illustrated with blocks and photos. Mr. Wallinger describes the various methods adopted in taking Creek Fish in the Kolaba district. He tells us there are no less than 14 common types of nets in use, that there are three kinds of night and day lines and three traps making a grand total of unpleasants!

Protective Legislation for Indian Fisheries.

Mr. Wallinger's paper induced Mr. E. Comber 'to rescue from what is probably, by this time, well nigh oblivion, an article that appeared in the *Field* of 2nd and 9th May 1903, over the initials "W. M.", on the Inland Fisheries of India, "in the hopes that by doing so it may possibly give the nail another tap on the head towards driving it home, and assist thereby in forcing the Government of India to realise its duties to the industries of the country by seriously undertaking the very needful legislation for the protection of one that is of the most importance to the population as a whole".'

'W. M.'s' paper must be read; but we quote the ending: 'It has sometimes been said that the cry for the better protection of Indian fisheries is a mere selfish cry raised by, and in the interests of, a limited number of English anglers. There could not be a greater error. The interests of the angler and of the legitimate netsman are identical. The recreation of the one and the livelihood of the other are both being seriously affected by the wholesale fish slaughter going on continually in the hill streams—the nurseries and breeding grounds of many species. The sporting point of view may be ignored, for it is insignificant when compared with the economic aspect of the question, an aspect which has hardly as yet been afforded serious consideration of Indian rivers growing worse, and it is earnestly to be hoped that the question will be thoroughly gone into before Lord Curzon's term of office expires'.

Mr. Wallinger's paper had some effect on the Bombay Government; and in 1910 a member of Government Service was appointed to enquire into the condition of the Fishing Industry. The gist of his report was that interference with the ancient customs and habits of the fishermen would cause so much trouble that it would not be compensated by the improvement in the Fish supply.

The following paragraphs from the report shows how difficult it is to induce even a 'sympathetic' Government to 'get a move on':

'The fresh water fisheries are not of much importance, though a certain quantity is taken from the streams as they fall, by means of weirs, nets and traps. Much of the fish so taken would die in any case owing to the drying up of the streams. On the other hand, the sea-fishing is of great importance. The sea is thoroughly exploited to a distance of eight or ten miles from the coast, by large vessels, whose appliances are quite as good as those used by fishermen on the south coast of England. Nearer land, smaller boats are used, and in the estuaries and on banks stake nets are permanently fixed. The amount of capital employed is considerable. The fishermen who supply the Bombay Market have learnt the use of ice, and the amount of fish sent from Bombay to all parts of India must be considerable.'

'To sum up, the sea-fishing industry in this Presidency is in a high state of development; the fresh water fisheries are important and flourishing in Sind, while elsewhere they are insignificant.'

'It will be evident that so far as this Presidency is concerned there is no need for the adoption of preventive measures. Government are however of opinion that the question of improving the fishing industry can be considered with advantage. The subject falls naturally under the following heads:—

(1) The exploitation of the fishing grounds;
(2) The preservation of the supply of fish;
(3) The utilization of the catches by access to markets, curing, smoking, canning, etc.;

and each of these heads must be considered with reference to fisheries in (1) fresh water, and (2) the sea and estuaries.' 'It does not appear that any action on the part of Government is called for in this Presidency in respect of inland fisheries, or in respect of the exploitation of sea fisheries including fishing in estuaries. It is in this latter respect that the great difference between Bombay on the one hand and Bengal and Madras on the other is most apparent. The sea-fishing industry of this Presidency is in a high state of development, while in Bengal it has apparently yet to be created and in Madras the reports contain much evidence of the inferiority of the enterprise and equipment of the industry.'

'The question of the preservation of sea fisheries does not arise, as owing to the amazing fecundity of the fish, the harvest of the sea is so bountiful and so constant that overfishing is impossible. No means of destruction which man can devise can effect any appreciable reduction in the supply. Bays and estuaries may be overfished, but even in these localities it is generally the distribution of the catches rather than their amount which is affected.'

The Fish supply of the West Coast.

The next development was in 1919, when the newly formed Industries Department turned its attention to the Fishing Industry of the Bombay Presidency and declared in its first Annual Report its appreciation of the need for scientific investigation of our local fisheries. It seemed that our local Government had become alive to a public duty, recognised and acted upon by all civilized countries, which had been too long ignored. In 1921, the steam trawler 'William Carrick' was acquired by the Bombay Government to investigate the fishery resources of the deep sea. At the same time the services of a Marine Biologist were secured to study the scientific and economic aspects of the Industry. The results of the work carried out by the trawler 'William Carrick' were embodied in a paper entitled the 'Fish Supply of the West Coast' by Sir Reginald Spence and S. H. Prater published in Volumes XXIX and XXXIV of the Journal. The authors indicated that the investigation carried out by the trawler was largely handicapped by Government's decision to subordinate all exploration to ascertaining the commercial possibilities of steam trawling in local waters. In other words to put exploitation before exploration or the cart before the horse. In reviewing the results of the work, the authors once again stressed the need for the creation in Bombay by Government of a definite agency to carry out such scientific research as would supply the data essential to the better development of the local Fisheries. A period of inaction was followed by the appointment in 1930 of a special officer to carry out a survey of the Fisheries of the Presidency. As a result the Bombay Government issued a report on the Marine Fisheries of the Presidency in 1933. The report while it acknowledges the need of scientific investigation of Fishery problems fails to make adequate recommendations for carrying out the work. A small beginning has however been made by Government in the appointment of a Fisheries Officer with the necessary scientific qualifications. It is a step which has at least in it the possibilities of development on the right lines.

The Takin.

Lieut. F. M. Bailey (now Lt.-Col. and Resident in Kashmir) sent us for publication in the Journal a photograph of a young male Takin in regard to which Mr. R. L. Lydekker wrote as follows in the *Field* of 13th October 1906 with an accompanying reproduction of another photograph. 'The photograph of a young takin (*Budorcas taxicolor*) from the Sikhim district has been kindly given me by Mr. Claude White, Commissioner of that province. It is of great interest, as being the first photograph of this curious ruminant ever taken; while the animal it represents is, I believe, the first example of its kind ever seen alive by a European. The animal was captured by natives and brought to Mr. White's camp, where it lived for some time, and appeared so healthy that strong hopes were entertained of the possibility of transporting it to England. Unfortunately, it died suddenly, it is supposed from having eaten the aconite which abounds in some parts of the district. When the photograph was taken, the young takin was believed to be less than a year old, the horns being mere straight prongs; nevertheless many of the characteristic features of the species are shown, especially the shaggy coat, the thick, clumsy limbs, and the comparatively short, rounded ears.'

In Volume XIX of this Journal, published in 1910, Mr. R. I. Pocock wrote a full description with coloured illustrations of the Takin (*Budorcas taxicolor*) now well known to Europeans. This remarkable animal was originally described by Brian Hodgson in 1850, from specimens procured by Major Jenkins from the Mishmis, north-east of Sadya, and two perfect skins of adults were presented in 1884 by Col. Graham to the Indian Museum.

In March 1912, in Vol. XXI, Capt. Bailey wrote further notes on Takin in the Mishmi Hills.

The Introduction of Cassia renigera *into Bombay.*

In March 1907, Father Blatter published a photo of *Cassia renigera* and wrote a note on its introduction into Bombay which is worth recording in view of the number of these beautiful trees now to be found in Bombay. Father Blatter reminds us that there are about 400 species of *Cassia* of which about 20 are found in the Bombay Presidency, and many more have been introduced to our gardens owing to their ornamental appearance. 'One *Cassia,* however, seems to match all the abovementioned species with regard to ornamental beauty, viz., *Cassia renigera,* of which Mr. W. Harvey Jones has obtained an excellent photograph which is reproduced here . . . The tree referred to, which is about 20 feet high, is in the garden of Mr. W. S. Millard on Malabar Hill, to whom it was sent from Rangoon by the Hon'ble R. A. Forbes-Sempill. Mr. Millard says that it is most beautiful *Cassia* he has ever seen, and even superior to *Cassia marginata* and *Cassia grandis.*'

Vol. XVIII.

A Gaur attacking and killing a man without provocation.

There have been arguments as to which to man is the most dangerous non-carnivorous animal in the jungle. The palm is generally given to the Buffalo though many give first place to the Elephant. Generally speaking one regards the non-carnivorous beasts as *très mèchant.* When they are wounded they may attack or when attacked they may defend themselves. Lt.-Col. H. V. Biggs, R. E., relates in Volume XVIII how in April 1907 a bull bison which he eventually shot deliberately charged a man. He tells us 'the man had been quietly cutting grass in a glade in the forest when a bull bison deliberately charged him from the other end of the glade, they said, 150 yards ofl. The man climbed a bamboo clump to escape, when the bull went for the clump, more or less broke it down, knocked the man out of it and killed him. According to their account it was a most deliberate, savage and unprovoked attack. I was fortunate enough to get this bull after four days' hard tracking with a shade temperature of 98° to 102°. He did not then appear to be particularly savage. Though wounded and being continually "jumped", in dense jungle where it was impossible to go noiselessly on account of the dead leaves, he only twice showed fight. The first time a shot in the back of the neck, which only missed the spinal cord by about 2 inches turned him, and the second time he was practically done and exposing his side as he swung round at close range was finished off. As near as I could tell, he was about 12 or 13 years old and had a very perfect and massive head with a spread of 40 inches. He was in prime condition and showed no signs of having been previously wounded, but there were not enough men to roll him over so as to examine both sides'.

Do Wild Animals ever die a Natural Death?

W. G. Betham, of the Forests, referring to Queries by Lt.-Col. Caton Jones and Mr. D. O. Witt, I.F.S., as 'Do Wild Dogs carry off their dead and bury them?' tells us that in the course of 40 years knocking about the wilds he could only remember to have come across one dead animal himself, whilst questioning of others has never elicited an answer in the affirmative. There have been several other papers since on the same subject notably by R. A. Wilson.

Lt.-Col. G. H. Evans comments in Vol. XIX on Mr. Betham's note. He writes:—'By natural death, I take it, is meant death only due to the more common causes such as old age and incidental troubles, death by violence and epidemics being excluded. That wild animals do die from ordinary causes is inevitable but the problem is, what becomes of their bodies? This question has always had considerable interest for me, and from time to time as occasion arose I have made notes on the subject. The publication of Mr. Betham's notes re-opened the matter in my mind and leads me to think that perhaps my experiences may be of interest. His experiences are interesting and his conclusion may be summed up in his own words: "I think it highly probable that wild animals know full well that the time is near at hand to seek fresh fields and pastures new, so instinctively they seek or are guided to some secluded spot not far from water where they can retire in peace and without much fear of molestation. Though hidden from vultures there are numbers of small mammals that may devour the flesh, and also ants and other insects do their full share. The rains arrive in due course, all the nullahs become fast running streams, the water often overflows the banks, remains are washed away by the floods or are covered with sand, mud, etc. As a rule when the larger mammals have been shot on high ground and in more or less open places, the skeleton or parts of it will lie about for years, whereas when shot near streams, swamps, etc. a couple of years usually suffice to remove all traces except such bones as the lower and upper jaws, pelvis and femur. Burmans state that old bones are freely partaken of by most animals on account of the lime. It is certainly uncommon to find many antlers lying about on grounds where deer are plentiful." '

Keenness of Sight in Birds and Animals.

The Keenness of Sight and of Scent in Animals and of Sight in Birds is always a fascinating subject. C. H. Donald's short article written in July 1907 (Vol. XVIII) on the subject of sight is well worth reading. Stuart Baker (XXVII) has written a lot on the power of scent, and so have Brig.-Genl. H. G. Burton (Vol. XXVII), Mr. H. Copley (Vol. XXVII), Dr. Wm. Forsyth, and Mr. B. P. Tailyour (Vol. XXIX).

The Sport of Kings.

To any to whom Falconry appeals we recommend C. H. Donald's article on a day's Hawking in February in India, which we published in the Journal in November 1908.

Vol. XIX.

The Kathiawar Lion.

Col. Fenton in Vol. XIX, No. 4 gives us under the heading 'The Kathiawar Lion' the first of a very interesting number of papers on the Lions of Asia. Subsequent papers were a further article on the Kathiawar Lion by Col. L. L. Fenton, Vol. XX, No. 3; 'The Past and Present distribution of the Lions in South-Eastern Asia' by N. B. Kinnear, Vol. XXIX, No. 1; 'The Lions of Asia' by R. I. Pocock, Vol. XXXIV, No. 3.

Death of EHA, 11th April, 1909.

Vol. XIX alas records the death of 'EHA'. T. R. Bell, I.F.S., his old friend of Kanara days writes of him—and, though many a good obituary has been written of him, the words of one who knew him so intimately are worth recording once again.

'Eha has passed away. To numbers of the old members of our Society the news will bring sorrow and regret. The world is poorer by a good man and a genial spirit. He died of Bright's disease, never doubting to the last that he would soon be better. Nearly two years ago he retired to Edinburgh, having completed a long official service in this country. Some weeks before his death his sight failed, and he was never informed of the cause which, when discovered, had advanced to a stage that rendered recovery hopeless. He died on the night of Easter Sunday, the 11th April, at his residence in Morningside Place, Edinburgh. He suffered nothing and passed away peacefully in his sleep. ....

'Edward Hamilton Aitken was born at Satara in the Bombay Presidency in the year 1851. He was the son of a Scotch Missionary. He was educated in Bombay and took the degree of B.A. and passed successfully the examination of M.A. in the Bombay University. He served first in the Educational Department, changed later into the Customs Department and rose to be Collector of Customs, Karachi, where the last two years of his time in India were passed. Having been brought up in this country, it was comparatively late in life that he went to England for the first time. The final change home, specially to a climate like that of Edinburgh in winter and spring, proved too severe for a man who had spent practically all his life in India, and there can be little doubt that it considerably hastened the end.

'Eha was one of the original founders of our Society. He edited, in conjunction with others, the first numbers of our Journal and from that time forward to the end continued to contribute notes and articles to it. All branches of Zoology interested him, but more specially birds and insects, and for many years he was in charge of the Society's Entomological Section. Most of his spare time was spent in the study of animal life and he had a special genius for seizing the striking and characteristic points in the appearance and behaviour of individual species, and a happy knack of translating them into print so as to render his descriptions unmistakable. He looked upon all creatures in the proper way, as if each had a soul and character of its own. He loved them all and was unwilling to hurt any of them and accordingly was not a collector of specimens except in a very small way, just enough to get as thorough a knowledge as he judged sufficient of their lives and habits. But he kept many pets in his time, chiefly birds, which he was never tired of watching. Originally his attention was mainly confined to birds but he soon took up insects and was more particularly interested in butterflies. These last he had special opportunities of studying during some years' service passed in Kanara, the richest District in this respect of the Bombay Presidency, and he made ample use of his time there in investigating and writing about their life histories.

'He was a shrewd observer of humanity too, as his book *Behind the Bungalow* testifies. This book is one of the Anglo-Indian classics and will remain a lasting monument to the memory of the author. His first literary venture was entitled *The Tribes on my Frontier,* describing the animals ordinarily met with in and around an Indian Bungalow. It is too widely known to require any remarks here. Another book of his is *The Common Birds of Bombay* which treats of the birds met with in the Town of Bombay and its vicinity in a manner that makes it easy for any one to recognise each individual when he sees it. *The Naturalist on the Prowl* written when he was in Kanara and full of the scent of the jungles is perhaps less generally known than those already mentioned. He made next to nothing by the sale of his first two books, large though it must have been. All his books are well known in India as they well deserve to be, for they are full of accurate knowledge pleasantly imparted, a quaint humour which cannot but appeal to the reader and the joyousness of living which expresses so well the nature of the writer.

'He was a good man in every sense of the word, a strongly religious man, a pleasant companion, broad minded, exceedingly tolerant of the weaknesses of others, gentle and lovable and a rare example of a man without a single enemy. At home in England he had looked forward to many years of leisure in which to write down the result of his life's observations in Natural History, and it is to be regretted that the time was not granted him in which to add to the debt of gratitude we owe him for the books he has left behind. It may be of interest to those who knew him that his funeral was attended by no fewer than five members of the Society. They were Dr. D. Macdonald, J. Davidson, I.C.S. (Retd.), Lt.-Col. W. B. Bannerman, Major G. Lamb, and Major C. J. Robertson-Milne.'

Vol. XXII.

Stray Notes on Old Indian Natural History and Sporting Periodicals.

Mr. Inverarity in a short paper takes us back to the India of 100 years ago and so in our Jubilee Number it may be of interest to repeat the note in full:—

'I think it may be of interest to recall some of the earlier publications in India which dealt with Sporting and Natural History subjects. The earliest in my possession is the *Oriental Sporting Magazine* which was published in Bombay in June 1828 and continued quarterly till June 1833. The *Bengal Sporting Magazine* was issued at Calcutta in March 1833 monthly at a subscription of Rs. 16 per annum, raised to Rs. 20 in 1837 when its title was altered to the *Bengal Sporting and General Magazine.* It ceased to exist in 1846. The *Calcutta Journal of Natural History,* the first Journal of the kind established in India, was published quarterly in 1840 or 1841 and consists of seven Volumes and two numbers of the 8th Volume; it ended in February 1848. *The India Sporting Review* began in March 1845, the last Volume I have is the fourteenth in 1851; it was published quarterly. There are, no doubt, other publications of a similar character, but I do not have them. The *Oriental Sporting Magazine* was republished in two Volumes by Henry S. King & Co. in 1873 and is easily procured. This Magazine in its first number contains the immortal song of "The next grey Boar we see" sung either to the tune "My love is like the Red Red Rose" or "My Highland home where tempests blow". It was written by Captain Thomas D'Arcy Morris, who appears to have been the principal contributor to this Magazine. He did not always sign his effusions, but when he did he (as my father who knew him informed me) signed S.Y.S., these being the last letters of his three names. Morris's forte was parody and many of his pigsticking songs are parodies of Moore, e.g. Tales of the Tuskers which enshrines "The Boar of Rarah Borah" is a parody on "The Loves of the Angels", "Oh think not our spear blades are always as bright" a parody on

"Oh think not our spirits are always as light", and "The spear that once o'er Deccan Dust," a parody on "The Harp that once thro' Tara's Halls," to mention only some of them.'

'Capt. Morris also wrote "Saddle, spur and spear" and many other songs which bear the signature S.Y.S., besides contributing several amusing prose papers. He seems to have been of the opinion of his own verse "Oh, who would change one hour of sport for a thousand hours with none." Major Morris, as he then was, died in 1835 from illness contracted in the campaign against the Bheels in Mahee Kanta. He was Quartermaster General of the Bombay Army. Pigs appear to have been numerous in the Bombay Presidency at this date. The Deal Table riders as mentioned in the Tales of the Tuskers were a detachment from the Poona Union Hunt established in 1815 and consisted of four members' legs, as they were called, of the table who derived their title from the circumstances of their taking no furniture with them except a common deal plank which served them as a dresser and dining table. The names of three of them were Jeffries, Davis and Malet. I have forgotten the name of the fourth.

'The huntsman mentioned in the Boar of Rarah Borah was Jeffries. The members of the Nagger Hunt used in those days, 80 years and more ago, to dine together in pink. I still possess the evening swallow-tail coat of my father made of scarlet mohair with black velvet collar and cuffs. The buttons are brass showing in relief a galloping boar with a broken spear in his back surrounded by the legend "The Boar, the mighty Boar".'

Vol. XXIV.

The Game Fishes of the Persian Gulf.

It is a well-known fact in the annals of sea-angling that the great gulfs of the tropical and temperate oceans abound with a variety of piscine life that is bewildering in its diversity. The reputation of the Gulf of Mexico and the Gulf of California is world-wide. The tuna and tarpon are household words amongst every community of fishermen; but a casual glance at a book such as *The Game Fishes of the World* by Charles Frederick Holder, LL.D., will suffice to show that the number of other sport-giving varieties is legion. It is remarkable that in this comprehensive Volume not a single word is mentioned of the Game Fishes to be found in the Persian Gulf. The reason is obvious. From an ichthyological standpoint practically nothing is known of this vast arm of the Indian Ocean. Is there any adequate reason why this huge inlet should not furnish a paradise for the disciple of Izaak Walton? It is with the object of elucidating this problem that Major W. H. Lane wrote his paper on the Game Fishes of the Persian Gulf.

As regards Jask itself he writes:—'No great effort at word-painting is required to portray this little speck of British dust. Jask is a spit of sand and rock that protrudes its barren dreariness into the Gulf of Oman, but from a piscatorial point of view this physical feature forms the foundation upon which the importance of Jask is built. Against the eastern shore of the promontory the deep and pellucid waters roll straight from the heart of the Indian Ocean without let or hindrance. The 15 knot liner or trooper proceeding up Gulf from the Gateway of India, after rounding the Prongs, lays a direct course to a point five miles south of Cape Jask. So it is also with the pelagic fishes; at the appointed seasons they set their noses Jaskwards. Here the five fathom line lies within a few cables distance of the fringe of diminutive cliffs that back the stretch of yellow sand in East Bay. Here the monsters from the open sea, although within close proximity to land, can still revel in the clear cobalt of the watery waste in which they have their being. What is the magnet that attracts the leviathans to this particular locality? There must be hundreds of other haunts where conditions would appear to be equally favourable. Yet why is Jask the Rome of the finny tribes to which all the watery ways would seem to lead? There is a law of Nature with regard to the fishes of the open sea which is as unalterable as the ancient law of the Medes and Persians:—

"Where the minnows are there will also be found the Tritons".

'To the west of Jask stretches a broad bay of shoal water, with a sandy bottom, the maximum depth of which would be about 30 feet. This bight furnishes an ideal spawning ground for the minnows. From October till March the mullet comes in in its troops to spawn; and acres of white-bait (locally termed matoot) blacken the surface of the sea. These pigmies are harassed mercilessly; they are attacked by the Tritons beneath the waves; they are slaughtered from the air by the gulls and terns; they are massacred from land by man in millions in his drag-nets. In March the remnants vanish, split up into scattered bands; yet year by year about the close of September they return in their trillions. So it is with the sardines; as far as the naked eye can see the surface is one continuous shimmer as if it were being stirred by a gentle zephyr. Anon they have vanished from mortal ken. Similarly in the first month of spring the "moran" (a species of fish that will be described later) arrives in countless hosts. Of an evening in mid-April from the extremity of Cape Jask for three-quarters of a mile along west bay and to the breadth of a couple of furlongs stretches a chaotic turmoil of leaping and splashing fish and flitting, shimming "moran". The sea is thick with "moran" spawn; it clings to the line in glutinous masses, to be removed when dry with the aid of a pair of scissors. By the close of spring hardly a ring breaks the placid surface which a few days previously resembled a seething cauldron. The "moran" are lying further off-shore. By the end of summer they have vanished, their places being taken by another species of the same fish but in far fewer numbers. Thus it is with them all; whence they come and whither they go no one knows, except that they come from and return to—"the open sea"; an indefinite enough term in all conscience; for the open sea is practically limitless!'

Vol. XXV.

The Oriental Sporting Magazine, 1869-1879.

Following on Mr. Inverarity's 'Stray Notes' already referred to, Lt.-Col. R. W. Burton in October 1917 sent us interesting notes culled by him from the new series of the *Oriental Sporting Magazine* published during the years 1869-1879. He points out that 'Deccan Ranger' (Col. H. Fraser) who shot for many years in the Hyderabad Dominions was of the same opinion as Colonel Burton himself, namely that measurement was an insufficient guide to size in tigers and that weight gave a much better indication. The average weights given by 'Deccan Ranger' for his bag were tigers 402 lb., tigresses 270 lb. A friend of Col. Fraser's, a Colonel Baigree who had shot over 200 tigers, records that the 9 feet 10 inches tiger shot by 'Deccan Ranger' which weighed 432½ lb. was the largest, except one, he had ever seen. Col. Burton tells us: 'The late Maharajah of Cooch Behar in *Shooting in Cooch Behar* records that the largest tiger—tail included—that he ever saw or shot was 10 feet 5 inches, this animal weighed 504 lb. The heaviest tiger actually weighed 546 lb. "fully gorged" and amongst the records given are 7 tigers which weighed 500 lb. or more. From this it is evident that the tigers of Bengal attain larger dimensions than those of Central India and Hyderabad. At page 144 of Vol. XXIII of our Journal, the measurements of a Central India tiger are given as 11 feet 6 inches, the body being 8 feet 2 inches and tail 3 feet 4 inches. It is a pity this animal was not weighed.'

Capturing Tigers with Bird Lime.

As regards the days of the Emperor Akbar, Col. Burton records: ' "Young Nimrod", a sportsman of experience disguised under this nom-de-plume, contributed a series of very interesting articles on the methods of shikar as pursued in the time of the Emperor Akbar and recorded in the "Ain-i-Akbari". Space and time do not permit of lengthy extracts. That some of the methods were cruel is illustrated by the recommendation that the tethered goat should have red pepper put in the eyes to ensure sufficient bleating! The device of strewing hay smeared with "glue" on the ground around the tethered bait so that the tiger gets his claws, paws and face covered with sticky grass which also gets into his eyes, is ingenious. History does not relate that it is practical! The presumption is that the tiger is found rolling about helpless in the near vicinity of the "kill" or tethered bait.'

Commenting on this Surgeon General Bannerman writing in March 1918 replies to Col. Burton's query as to whether the method of capturing tigers with hay smeared with glue is practical. He tells us: 'Whether practical or not, the practice seems to have survived in the Central Provinces. In 1890-91, I was stationed at Sambalpur in the Chattisghar Division of that Province, and was told that the jungle people there were in the habit of getting at tigers by laying down leaves smeared with bird-lime on paths frequented by the tiger they were after. It was mostly in the hot weather they did this in the neighbourhood of water pools, but probably they did it round a kill as well.

'They told me that the tiger was annoyed by the leaves sticking to his paws, and tried to rub the leaves off on his head. The leaves then stuck to the face in such numbers as to blind the tiger, which could with safety be approached and speared, while in this helpless state.'

The Musk Deer.

In a later note in the same Volume of the Journal Col. Burton refers to the size of Wild Boars and to variation in size of the Pod of the Musk Deer. He writes:—

'At p. 300 of Vol. IX, 1876, mention is made of the belief that the size of the pod of the Musk Deer varies with the increasing and waning of the moon. Marco Polo mentions the same in his travels, and it is commonly believed and asserted by the hillmen and shikaries of the lower Himalayas. The writer has shot two musk deer only, each of which weighed 30 lb. and the pod of the one, shot on a day when the moon was full, was larger than that of the animal killed when the moon was five or six days on the wane; but a large series of observations would be necessary to arrive at a proper conclusion of the matter. Hillmen, north of Mussoorie, told the writer that the panther is sometimes killed by the male musk deer who, when seized by the throat, jabs his tusks into the panther's head! It can be imagined that no instance of such an occurrence could be quoted by the relators of this fanciful story'.

Vol. XXVI.

Vol. XXVI is the last Volume of the Society's Journal with which Mr. Millard and Mr. N. B. Kinnear were associated as editors. The first part of Vol. XXVII appeared after both these gentlemen had left India, and Vol. XXVI in a way marks the close of what we may call the second period of the Society's existence. Mr. Phipson's departure marked the close of the first period—the intimate or homely period—the Society seemed self-contained, interested only in its members and what they did and could do for the Society. Not interested in the doings of Government, nor asking for Government help.

The second period, which coincided with Mr. Millard's tenure of office as sole Honorary Secretary, marks the development of the Society from its position as a private Society of men and women interested in Natural History into a Society which was consulted by Government and which co-operated with Government. Thanks to this co-operation a great amount of valuable work was able to be brought to fruition which otherwise would never have been undertaken.

At the beginning of the present century, Mr. H. M. Phipson at the suggestion of the British Museum had tried to raise funds to provide for a Marine Survey of the Coasts between Bombay and Karachi—a study of the Fish to be met during different periods of the year might provide very valuable assistance to the Fishing Industry, and it was hoped that it might be able to utilize surplus stocks of fish as a manure which could be sent all over India. An appeal was made to members of the Society and their friends, but no attempt was made to associate Government with the work, and though His Highness the Maharao of Cutch offered to give Rs. 1,000 per annum for three years, the estimated period of this Survey, sufficient money was not forthcoming and nothing was done.

Mr. Millard decided to enlist the help of Government whilst keeping the management and control in the hands of the Society. As a result of his policy he was able to carry through to a successful issue the Mammal Survey of India and Burma. His policy enabled the Society to obtain the services as Curator of Mr. N. B. Kinnear; and though the Society no longer draws the grant given it by Government to help pay the salary of the Curator—Government has transferred that grant in more ample form to the Natural History Section of the Prince of Wales Museum—the benefit which the Society has been enabled to confer on residents in Bombay has increased beyond anything the original founders of the Society could have imagined.

Mr. Millard and Mr. Kinnear developed close relationship with the British Museum and the Indian Museum in Calcutta, and the pages of the Journal became more and more the avenue for the publication of illustrated serial papers on Birds, Mammals, Snakes, and Butterflies which only a Society like ours could have published. The Journal became the symbol of the Society, it was what members joined for. No one would join the Society if it were not for the journal.

The Future of the Journal.

It is this fact which has made the editing of the Journal in the past twelve years so difficult, and it is this fact which is going to make it more difficult in the future. The Journal must be interesting to the ordinary 'man in the street' otherwise he will not join. The extracts we have given from the first 26 Volumes prove that it was interesting in the past, and were it not that the last seven or eight Volumes are of such recent date as to be in the hands of the great majority of members, we could quote many a note to show that we still can interest the ordinary man.

A member of the Committee expressed this well a short time ago. We want to be a Natural History 'Maga'. *Blackwood's Magazine* is able to do however what we cannot do. It is able to attract *and to pay*. We may be able to do the former, we shall never be able to do the latter. Our inability in this respect makes us realise how much we owe to those who in the past fifty years, have, simply through love of Natural History, built up this Society through the interest which their writings in the Journal have created.

If the previous pages have not sufficiently expressed our thanks, if we have not shewn to members of the Society, who have joined in recent years, that the old Volumes of the Journal are living records of nature as it existed and exists today, it is the present editors' fault and theirs alone, but the perusal of the old Journals by the editors have very definitely shown them how much they, the editors, have to be grateful for.

To all the contributors to the pages of the Journal we tender our thanks. To those who happily are still with us, we, remembering the immortal Oliver, ask for more.

PAPERS ON SHOOTING AND FISHING

Numerous Sportsmen have contributed articles on Shooting in the Indian Empire and the regions beyond its frontiers during the past 50 years. Their experiences so recorded form a useful guide to those who require information on the subject, and a list of the more important articles is published below. It is limited to accounts of hunting and fishing in various localities.

Apart from this the Journal contains a very large number of notes and articles on the wild animals of the Indian Empire, their natural history and the ways of hunting them. Space does not permit us to give details of these interesting and valuable contributions which deal with almost every phase of the lives and habits of the game animals inhabiting India and its Dependencies. We have published over a hundred articles and notes dealing with the Tiger alone. These recorded observations spread over 36 volumes have made the Society's Journal a real Encyclopaedia of Natural History and Sport in India. They are an eloquent tribute to the keenness and enterprise of many sportsmen who by their writings have made a great contribution to knowledge.

It is sincerely hoped that this splendid tradition will be maintained and that members of the Society will continue to record their experiences in the pages of its Journal.

Shooting

Trans-Himalayas, Kashmir and Tibet:

Shooting *Ovis poli* in the Pamirs, Vol. X, 53; Baron Edmond de Poincins.
Shooting Expedition in the Pamirs, Vol. XIII, 385, 543.
Expedition for *Ovis poli;* W. J. Morden (Vol. XXXIV, 742).
Yak Shooting in Tibet; (XIII, 134).
Game Animals from near Gyantse and the Chumbi Valley; F. M. Bailey (XX, 1028).
Camping in Chamba; H. Littledale (XI, 482).
Rough Notes on Sport and Travel in Kashmir; H. Littledale (IV, 98).
Big Game Shooting in Kashmir and the adjacent Provinces; Col. A. E. Ward (Vols. XXVIII-XXIX).

Hunting Straight-horned Markhor; C. H. Stockley (Vol XXX, 172).

Afghanistan:

Markhor Shooting in E. Afghanistan; J. E. Penton (Vol. V, 418).

Punjab and the N.W.F.P.:

Small Game Shooting in the Peshawar District; J. H. Yule (XI, 160).
A few days after Oorial in the Punjab; R. W. Burton (XXX, 838).
Three months up the Valley of the Sutlej River; R. W. Burton (XXXI, 23, 352).
Sporting Rambles round Simla; J. C. Anderson (IV, 56).
Pheasant shooting round about hill stations in N. India (XIX, 795).

United Provinces:

Notes on Shooting in Oudh; S. Eardly Wilmot (XI, 312).
Notes on Sports in Oudh; S. Eardly Wilmot (XII, 223).
Shooting Notes from the Garhwal Himalayas; R. H. Heath (XVIII, 931).
A Sporting Trip to the Pindari Glacier; F. Field (Vol. XXX, 42, 380).
Notes on Duck shooting in the Roorkee District, U. P., in the years 1903 to 1927; A. H. Cunningham (Vol. XXXII, 600).

Assam:

Small Game Shooting in Sylhet; W. V. Weston (Vol. XXIII, p. 367).
Small Game Shooting in the Khasia Hills; E. McCulloch (XXX, 441).
Game Animals and Birds of Manipur; J. C. Higgins (XXXVI, 4 parts).
Gaur and Gayal in Assam; E. C. S. Baker (XV, 227).
Notes on Duck shooting in the Khasia Hills; E. McCulloch (Vol. XXXI, 728).

Burma:

Elephant Shooting in Upper Burma; E. R. Jardine (XIV, 160).
Thamin Shooting; G. H. Evans (IX, 326).
Hogdeer in Burma; ,, (XIV, 310).
Burmese Goat Antelope or Serow; G. H. Evans (XI, 95).
Burmese Takin (XXIII, 355).
Takin Shooting in the Spring; E. Maxwell West (XXXI, 74).
The Gaur and the Tsine in Burma; Pollock (XII, 187).
Woodcock in Burma; E. H. Cooke (Vol. XXXIII, 207).
Notes on Woodcock near Rangoon, E. O. Bloech (XXXIII,

Takin Shooting in the Spring; E. M. West (Vol. XXXI, 274.

Rajputana, Central India, C. P., and the Berars:

Big Game and Ducks of the Dhar State (XXVI, 841).
Hot weather Notes in the C. P.; E. F. Beacher (III, 134).
Shooting in Raipur; E. F. Beacher (VIII, 556).
A Day Sport in the Berars (VIII, 295).
Jungle Notes (Jalna and Hyderabad); R. G. Burton (XII, 587).
Shooting in the C. P.; W. H. Hunter (X, 691).
Shooting in the C. P.; T. W. Caton Jones (XVI, 754).
Snipe Shooting round Secunderabad; W. Gaye (VI, 418).
Duck Shooting in Rajputana; L. Impey (XIX, 750).
After Buffalo and Bison in the High Sal Forests; J. A. Duke, (XXXIII, 419).

Bombay Presidency:

Small Game Shooting in the Neighbourhood of Bombay; E. L. Barton (VIII, 155).
Small Game Shooting in the Kharaghora Dist.; H. Bulkley (XI, 163).
Sport and Natural History in N. Gujarat; C. G. Nurse (XIII, 337).
Goose Shooting in Cutch (XXI, 678).
Florican Shooting in Kathiawar (XVIII, 909).
Shikar round Poona; Maj. W. B. Trevenen (Vol. XXVIII, 1075).

Madras Presidency:

Larger Mammals of the Nelliampathy Hills; A. P. Kinloch (XXIX, 553).
Elephant Shooting in the Bagur Hills; R. C. Morris (XXXIV, 861).
Woodcock Shooting in the Nilgiris; W. Lambton (XX, 854).
A day's Shooting near Ootacamund; Lt.-Col. H. R. Baker (XXVIII, 430).
An Elephant Shoot on the Baragur Hills, Coimbatore Dist.; R.C. Morris (XXI, 720; XXXIII, 861).
Record of Big game shot in the Nilgiris area 1905-1931; R. C. Morris (XXXVI, 252).

General:

The use of patent bulets in shot-guns; E. L. McCulloch (XXXI, 1040); W. H. Shortt (XXII, 384).
The Sawn-off shot-gun—the Watchman's gun; W. W. A. Phillips (XXXIII, 987).
The heart-short in Game; R. C. Morris (XXXIV, 805).

Some suggestions on Panther shooting; Ramanuj of Surgiya (XXXV, 441).
Use of Artificial light in panther-shooting, R. C. Morris (XXXV, 887).
Small bore Rifles and Big Game; L. D. W. Hearsey (XXXVI, 254).

FISHING

Many members of the Society are interested in Fishing. The following papers have appeared in the Journal during the period under review.

Fishing in Indian Waters by F. O. Gadsden.
Pt. I. Bhamin Fishing in the Coromandel W. Coast, Vol. XII, p. 194
Pt. II. Mullet and Gar Fish, Vol. XII, p. 404.
Pt. III. Fishing in Aden and the adajacent waters, Vol. XII, 539.
Pt. IV. Fishing in the Andamans, Vol. XII, p. 726.
Pt. V. Fishing in Karachi, Vol. XIII, 113.
Pt. VI. Open Deep Sea Fishing, Vol. XIII, 355.
Waters of Western India by W. F. Sinclair being an account of the Mammals, Birds, Reptiles and Fishes found in or about the coastal and inland waters of Western India.
Deccan, Vol. I, p. 97; Konkan Coast, Vol. I, p. 153; Vol. II, pp. 1 and 73.
Gujerat, Vol. II, pp. 159 and 221; Sind, Vol. III, p. 1.
Estuary Fishing in India (Bhamin and Cockup on the Malabar Coast). Shene Dhir, Vol. XVIII, 691.
Fly Fishing in the Bombay Presidency (*Megalops cyprinoides* as a fly-taker); W. A. Wallinger, Vol. XV, 719.
Trout and other Fishing in Ceylon; R. A. G. Festing. Vol. XVI, 379.
Bhamin Fishing in Bombay Harbour, E. L. Banton (Vol. XI, 742).
Angling round Bombay; G. Traylen. (Vol. XXIX, 269).
Fishing in the Rivers of the C. P. Maj. W. B. Trevenen (Vol. (XXXIV, 700).
Fishing in the Deccan Lakes. Maj. W. B. Trevenen (Vol. XXXI, 120).
Mahseer in Burma and their habits. A. MacDonald (Vol. XXXIII, 312).
Game Fishes of Bombay, the Deccan and the neighbouring Districts, Sir Reginald Spence and S. H. Prater (Vol. XXXVI, 29).

PART III

EXPEDITIONS AND EXPLORATIONS.

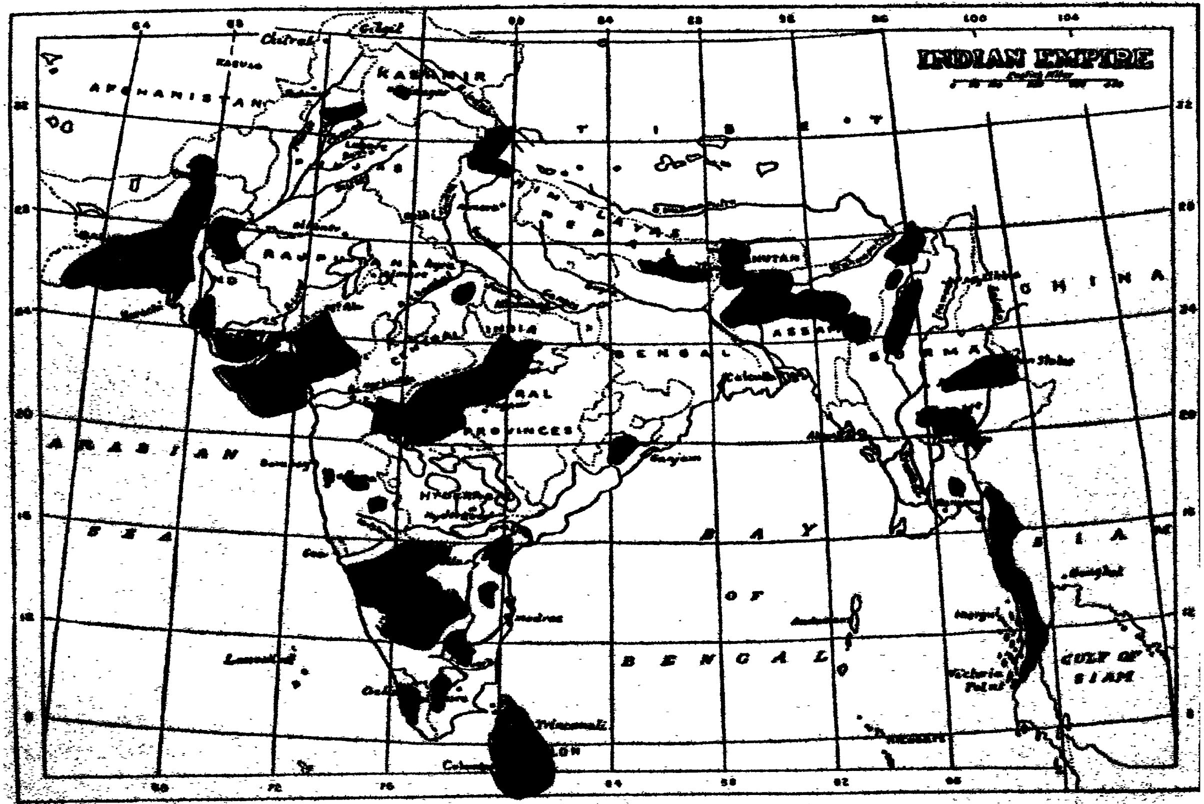
The Mammal Survey of India, Burma and Ceylon 1911-1923.—

In the year 1911, the Committee of the Society decided to undertake a systematic survey of the Mammals of India, Burma and Ceylon.

The purpose of the Survey was to secure a systematic series of carefully preserved skins and skulls of the Mammals of the Indian Empire and Ceylon, collected in different provinces, in order to provide the material necessary for a comprehensive study of the status, variation and distribution of species. Such material was non-existent. The collection of Indian Mammals in the British Museum and in the Museums in India were remarkably inadequate.

The Society's Mammal collection had been built up by its members. Notable contributions were made by Col. Ward, Major Magrath, Major Hutton, Major Dunn and Capt. Whitehead. But it was realised that a task of the magnitude of the proposed Survey could not be left to the efforts of private collectors. It was work which could only be effectively carried out by trained collectors expressly employed for the purpose and at no small expense. The Society therefore issued an appeal for funds for carrying out the survey. The response from its members was immediate. By the 1st of April 1911, over Rs. 10,000 had been subscribed in sums ranging from Rs. 5 to Rs. 2,000. Several of the Indian Princes on the roll of the Society supported the survey very generously. Before the end of the year the Mammal Fund had increased to over Rs. 20,000. Among the distinguished donors abroad was H. R. H. the Duke of Connaught. In the following year 1912, the Government of India and most of the Provincial Governments interested themselves in the survey and helped it with generous grants. Contributions were also received from the Government of Ceylon and the Government of the Federated Malay States so that by the end of 1913 the fund had swelled to over Rs. 66,000 and in May of the following year it reached Rs. 80,929. Contributions were received from the Trustees of the British Museum, the Royal Society, the Indian Museum, Calcutta, and other Scientific bodies. The outbreak of the War put a temporary stop to the rapid progress of the survey. But the Society continued to collect subscriptions. On the 30th of April 1915, the total amount received in donations was Rs. 85,762-10-7, while the total expenditure amounted to Rs. 77,320-14-4 leaving a balance of Rs. 10,485-9-8.

Between 1915-1919 Rs. 15,000 were received in donations from members, while a grant of Rs. 50,000 from the Government of India enabled the Society to engage new collectors to carry on and complete the survey which was brought to a close in 1923.



Map showing areas where mammals were collected by the Mammal Survey and other Surveys.

The actual work of the Survey commenced with the engagement of a collector, Mr. C. A. Crump, who was employed in January 1911. Mr. Crump had formerly worked as a collector under Col. A. E. Ward in Kashmir and returned to India in the hope of securing fresh employment. He was fortunate enough to arrive at the Society's offices when the Society was on the look out for collectors with experience.

Areas covered by the Survey.

Mr. Crump started work on the 5th of March at Jalgaon, East Khandesh. A taxidermist by profession, his experience stood him in good stead in the field, and the collections made by him in the course of the Survey are marked by the uniform care and ability with which they were prepared.

Between May and June 1911, Crump collected in the Berars and then moved to the Province of Cutch, where a large and interesting collection was made. In November and December 1911 he worked in Nimar, C. India, and then moved to the Central Provinces where he collected till the end of June 1912.

After a brief spell in Bombay he resumed work in September and collected in Kathiawar and Rajkot till February 1913 when he moved to Rajputana collecting in Palanpur and Mt. Abu till July. From the deserts of Rajputana, Crump went to Kumaon where he collected along the western boundary of Nepal on a line between Philibhit (800 ft.) and the Pindari Glacier (12,000 ft.). The collection made in a country so near and so physically similar to Nepal provided numerous 'topotypes' of species previously described by Hodgson. Crump worked in Kumaon from August 1913 till March of the following year. From May to September 1914, he collected in the southern part of the Province of Bengal and in Bihar and Orissa. In October he moved north to Sikkim where he worked from October 1914 till April 1915, obtaining a magnificent collection comprising 1,025 specimens.

In the meanwhile other collectors were working other provinces.

In October 1911, the Society was able to secure the services of a second collector, Mr. G. C. Shortridge who had just returned to England from the British Ornithologist Expedition to New Guinea. Previous to this Mr. Shortridge had done extensive collecting for the British Museum in Java and Northern Australia. The intensive methods of collecting which he introduced had a remarkable effect in increasing the numbers of specimens obtained. His wide experience of the ways of animals and his untiring energy made him a most successful collector. His first collection of 749 specimens obtained during four months' collecting at Dharwar was an eye-opener as to what could be accomplished. From Dharwar Shortridge went to Kanara and, during 1912, collected in this district, and in Mysore and in Bellary. At the end of the year he was sent to Coorg, where he worked till the end of February 1913. The Society then decided to send him to Burma, where, it was realised, his services could be employed with advantage because of his previous experience of collecting in the Malay countries. Shortridge started work in the Northern Shan States in April 1913.

In July, on the outbreak of the monsoon he moved to the dry zone of Central Burma and collected in the Myingyan District to the south of Mandalay, principally at Mount Popa. The scanty rainfall of this area enabled him to work the district during the monsoon. 1,090 specimens were obtained by him between July and October. In December, Shortridge went south to Lower Tenasserim where he collected at Victoria Point and about Mergui Town till April 1914. The problem of working the Survey in Burma proved to be more difficult than was anticipated owing to the immense amount of country to be covered, the number of places to be visited, the density of the jungle, the expense of transit and the fact that the fair weather season—the only time when collecting could be done—was so short. In consequence it was decided to engage another collector to assist Mr. Shortridge. The late Capt. Macmillan, who at that time was in a rubber plantation, was employed by the Society. He was a keen hunter and had a helpful knowledge of the local languages.

Mr. Shortridge and Capt. Macmillan came north to Rangoon in May 1914, and then left by river on their new famous expedition up the Chindwin where between June and August 1914 they succeeded in securing the most ample material ever obtained for the study of the fauna of a complete river basin.

In the meanwhile the Survey had been extended into Ceylon. Great difficulty was experienced in working out the collections obtained by Shortridge in Kanara, Mysore and Coorg owing to the absence of collections from Ceylon; since in the Synonymy of South Indian Mammals there are many species described by Kelaart, Blyth and others from Ceylon. A third collector, Major E. W. Mayor, was engaged therefore to survey the island. He commenced work in Ceylon in March 1913. His first collection was made in the extreme south of the Island. It provided valuable material for comparison with mainland forms which had been obtained in Southern India. In June 1913, Major Mayor moved to the mountain zone of Central Ceylon and subsequently to the Northern and Eastern Provinces working till March 1914, when he forwarded his second collection which included a large number of species peculiar to the Island.

The outbreak of the War in August 1914 put a stop to the work of our collectors in the field and sent them out on a grimmer quest. Major Mayor had returned from Ceylon and was working in the Gwalior State when the War broke out. He was on the army reserve and left India in August to rejoin his regiment. Mr. Shortridge and Capt. Macmillan hurried back from Burma and left for the front two months later. Mr. Crump was at the time in Sikkim. He remained at work till May 1915 and then went home to enlist. He received a commission and a year later earned the Military Cross and was wounded.

Capt. A. S. Macmillan died in France on the 9th of May 1915 from wounds received while leading his men into action. Capt. Shortridge served through the War and on its conclusion went to South Africa, where he is at present Curator of the Kaffrarian Museum, King William's Town, S. Africa. He has since undertaken several important collecting expeditions in South and South-

West Africa and has done much to enrich the collection of the British Museum and of his own institution.

Though the War gave a temporary setback to the Survey, the Society endeavoured to carry on. Mr. S. P. N. Pillay, late Curator of the Trivandrum Museum, was engaged to collect in South India and worked in Travancore from May to November

Mr. S. H. Prater, then Assistant Curator of the Society, was sent to the Koyna Valley where he collected from December 1914 to January 1915. In February Mr. Prater went to Northern Sind where he collected in the Kashmor, Larkana and Sukkur Districts and also in the Khairpur State returning to Bombay in May with a collection of a 1,000 specimens. In May 1917, Mr. Prater joined Fr. Blatter and Professor Hallberg on an expedition to the High Wavy Mountains in the Madura district where a small collection was obtained.

When Mr. Crump left Sikkim in May 1915 he left behind Mr. N. A. Baptista, one of the Society's Museum assistants. Baptista continued Mr. Crump's work. He collected in the Darjeeling District from June to August 1915 under the supervision and with the help of Mr. H. S. Stevens and Mr. H. Lister, both members of the Society, who offered to assist him. Baptista then moved eastwards to the Bhutan Duars, where Mr. H. V. O'Donnel promised to look after him. He collected in the tea gardens between October 1915 and May 1916 and then went to Kalimpong, where he worked under Dr. Sutherland till October of that year. From the Eastern Himalayas Baptista was sent to join Col., now Sir Ernest Hotson, in Baluchistan. Sir Ernest, who closed his distinguished career in the Indian Civil Service as Governor of Bombay, was a keen naturalist and made many valuable contributions to the Society's collections. Baptista worked in Baluchistan till the end of July 1918 and then followed Sir Ernest to Persia where he collected till the end of 1919. In August 1920, Baptista was sent to Nepal to work under the direction of Lt.-Col. Kennion, the British Envoy at the Court of Nepal. He collected in the Nepal Terai and in the Central and Northern Region up to the end of May 1921. In the following year, from May 1922 to May 1923 he worked the districts to the west of Khatmandu. His collections from Nepal formed perhaps the most remarkable contribution to Indian Mammalogy made by the entire Survey.

In the meanwhile as none of the old collectors had returned, it was decided to engage new men. Mr. H. Wells who was employed in June 1919, started work in the Mishmi Hills where he collected from October 1919 to July 1920, covering the greater part of Assam with the exception of the Manipur and Lushai Hills.

In February 1922, Wells moved to the Western Himalayas and commenced work in Chamba and the Kangra Valley where he remained till January 1923. In February 1923, he went to Murree and then to the Salt Range, Punjab, collecting there to the end of June.

Mr. C. M. Primrose was engaged by the Society in 1921 and commenced his work in the Mergui Archipelago. Mr. Shortridge had collected in Mergui Town in 1914 but Primrose was occupied mainly with the numerous Islands which form the Archipelago. He surveyed these islands from September 1921 to May 1922.

A third collector, the late Mr. Riley O'Brien, was engaged in the same year and was sent to South India, to work the Nelliampathy Hills. He collected in the Nelliampathy Plateau and also secured a small collection from the Nilgiris between April 1921 and January 1922. In June 1922, O'Brien joined Primrose who had returned from Mergui on a Survey of the Gwalior State which had been interrupted by the outbreak of the War. Both collectors worked in Gwalior till December 1922, when Primrose left the service and O'Brien was compelled to resign, owing to an illness from which he never recovered. O'Brien's work in the South India Hill ranges was taken up by Mr. C. McCann, now Assistant Curator of the Society. He worked in the Palni Hills, where he remained till the rains of 1922. In October he went North to the Indus Delta and collected there till the end of the year, supplementing the collections obtained by Mr. Prater in Northern Sind.

Many members helped the Survey directly by making collections on their own or assisting our collectors to make them. Mention has already been made of the valuable work carried out by Sir Ernest Hotson, Lt.-Col. Kennion and others. Apart from this other members volunteered their services as collectors in an honorary capacity. Prominent among these was Mr. J. M. D. Mackenzie of the Burma Forest Services, who collected in Burma for a number of years. His first collection was made in the Pegu Division, Lower Burma, between November 1915 and May 1916. From September 1916 to February 1917, he worked Prome Division extending northward the work he carried out in Pegu. In 1926 Mr. Mackenzie went still further north to the Toungoo District. His collections from these areas made a valuable contribution to the Survey in Burma, and helped materially in extending our knowledge of the Mammals of the Provinces.

In India proper Capt. Phillip Gosse, R.A.M.C., during the brief period of his service in this country—1918-1919—collected in the Poona District and later in the Nilgiri Hills. His collection from Poona helped to link up the material obtained by the Survey in Khandesh and Satara, while the Nilgiri specimens formed a useful supplement to the collections made in the South Indian Hill ranges.

Mr. J. P. Mills collected in the Naga Hills and so assisted in completing the Survey of Assam. Lt.-Col. C. H. Stockley between July 1921 and November 1923 carried out Surveys of 4 different areas in Kashmir, Punjab, Sind.

This completes a brief account of the areas covered by the Society's Mammal Survey. The attached map will indicate the various provinces or districts in which the work was carried out during the 12 years the Survey was in operation.

Scientific Results of the Mammal Survey

Blanford's *Mammalia of India,* while it is even today the standard work on the Mammals of the country, was written mainly on the pre-Darwinian lines on which the earlier Naturalists in India worked.

The earlier Mammalogists who collected or wrote about the Mammals of India, while they made an immense contribution to the systematic Mammalogy of India, limited their observations mainly to the salient characters and marked differences between the species.

But the lines on which modern Zoology is progressing makes it equally, if not more, important not only to classify species, but systematically to record such geographical variations as may be exhibited by them; a record of these differences, even if they are trivial, provided that they are constant, will furnish data for the investigation of problems relative to the variation and distribution of species.

The value of the collection obtained by the Survey lay firstly in that for the first time series of carefully prepared specimens of Indian Mammals, obtained in different areas of their habitat were available and thereby furnished data for the investigation of problems relative to their variation and distribution.

Secondly, in deciding the areas in which our collectors worked, a special effort was made to cover the districts in which the earlier naturalists collected.

No advance in systematic Mammalogy was possible without the re-examination of material illustrative of the species named by the earlier writers. The type specimens on which the written descriptions of these species were based, were in many instances no longer available. The Survey provided a series of topotypes obtained in the localities from which the 'types' originated.

The collection made by Shortridge in the Dharwar District, where Sir William Elliot collected 70 years previously, provided topotypes of no less than 8 species named by Gray from specimens obtained by Elliot. Crump's collection from Bengal, Bihar and Orissa again furnished a number of specimens which represented 'types' which have either disappeared or were no longer available for examination. Mayor's collection from Ceylon furnished data, the absence of which had made it impossible to work out several Indian species which had originally been described from Ceylon and which had remained doubtful till the Survey was carried out; while Baptista's collections from Nepal by providing 'topotypical' material for judging the many nominal species described by Hodgson as peculiar to Nepal, proved one of the most valuable contributions made by the Survey to Indian Mammalogy. The Survey further provided valuable evidence relative to the general distribution of Mammals in the region which it covered. It indicated the extent of the intrusion of 'northern' forms into the Peninsula Region and provided valuable evidence relative to the extent of the incursion of the 'plains' fauna into the Himalayan region as was illustrated by the discovery in the mountains of Chamba and Sikkim of such obviously low country species as the common fox and the 5-striped squirrel. The Survey also gave a more exact idea of the distribution of species in South India and Ceylon.

Particularly interesting from the standpoint of distribution were the collections made along the great barrier chain of the Himalayas.

Mr. Crump's magnificent collection from Sikkim showed that a sharp line of demarcation existed at about 28° N. between the two distinct faunas, i.e. the Palaearctic in the North and the Oriental in the South. This was indicated by the juxtaposition of such Palaearctic genera as Voles, Mousehares, Water Shrews, Marmots and Musk Deer with such characteristically Oriental forms as Flying Foxes, Tree Shrews, Civets, Mungoose, Bamboo Rats and Barking Deer. Further the collection indicated that the area is a meeting point of the Indian and Malayan faunas of the Oriental Region as was instanced by the numerous kinds of Squirrels represented in the collection which did not occur in the Indian Peninsula but were widely distributed through Burma, Western China and Siam. The intrusion of these Malayan forms along the Himalayan chain weakened as one travelled west. On the other hand the collections from Kumaon contained examples of such species as the Mole Rat (*Nesokia*) which extends westward through Persia to Palestine, Egypt, but does not extend eastward beyond Nepal. Equally interesting was the discovery in Baluchistan of the Vesper Mouse (*Calomyscus hotsoni* and *C. baluchi*), a genus intimately related to the New World genus *Peromyscus*. A third species *C. bailwardi* was previously known from Persia. These three species form a small isolated group without any intermediate forms either structurally or geographically between them and the American *Peromyscus*.

The Survey material again furnished frequent data relative to the distribution of individual genera and species. The magnificent collection of squirrels numbering 400 specimens obtained on both banks of the Chindwin River provided striking evidence that this river forms a barrier to the westward extension of the different species of squirrels. The species inhabiting the west and those found eastward were found to be generally referable to two different groups thus indicating that the separation had been of long enough standing, long enough for the groups on each bank to have respectively evolved a rich series of sub-species found in succession from North to South.

Forty-six reports of the collections obtained by the Survey and worked out at the British Museum were published in the Journal of the Bombay Natural History Society. They form useful local lists indicating the various species obtained in the different localities in which the Survey operated.

While the descriptions of the earlier writers covered fairly completely the various species of Mammals occurring in the Indian Empire and Ceylon, the Survey was instrumental in bringing to light several new genera and a large number of new species, some of them of a very striking character.

As was expected, the collections furnished splendid material for the study of variation which resulted in the description of numerous racial forms based on an examination of series of specimens collected over a wide area. The material also made possible and necessary the revision of various groups and genera which could not have been undertaken without the ample data provided by the Survey.

The enormous collection obtained by the Survey numbering over 50,000 specimens were worked out in detail at the British Museum by various authorities. Prominent among them was the late Mr. Oldfield Thomas, Curator of Mammals at the British Museum, and the late Mr. R. C. Wroughton who, after his retirement from India as Inspector-General of Forests, became one of the very notable honorary workers at South Kensington. The great contributions to Indian Mammalogy based on the material obtained by the Survey, made by Thomas and Wroughton will remain a lasting monument to their labours. The onerous task of cataloguing and checking the collection was left to the devoted labours of the late Mr. T. B. Fry, who like his brother-in-law, Wroughton, had retired from the Forest Service and spent his days as a voluntary worker at the Museum. His painstaking and laborious work was of immense value in assuring the very substantial results obtained by the Survey.

The work of Mr. Wroughton and Mr. Oldfield Thomas is now being continued by Mr. Martin Hinton and Mr. Pocock who between them are engaged in bringing out a new edition of the *Mammalia of India*—which was rendered imperative by the great advance made in Indian Mammalogy as a result of the Society's work.

The Taxonomic results of the Society's Mammal Survey appeared in 47 papers entitled the 'Scientific Results of the Mammal Survey' under the authorship of Messrs. Wroughton, Oldfield Thomas, Martin Hinton, Pocock and Mrs. Kathleen Ryley.

The substantial results so recorded form together a tremendous contribution to the Progress of Indian Systematic Mammalogy.

It was not expected or intended that the Survey should cover the whole field of Indian Mammalogy. The object was to set up a solid frame-work on which to build—to remove those obstacles which handicapped the work of the earlier Mammalogists by providing the necessary collections to form the basis of future work. The desirability of further collections by private individuals has not been lessened but increased. The Survey collectors were not able always to make complete collections of animals from the districts in which they worked or to visit every part of the area. Again the collections in a given area were only made at one season. The magnificent series of squirrels including 200 specimens thoroughly illustrating the squirrel life of both sides of the Chindwin River over a distance of 250 miles had one flaw, it was secured only at one season of the year and could provide no means of studying variations which might occur as a result of seasonal change. Again though a splendid collection comprising 749 specimens was obtained in the Dharwar district during the 4 months our collector was working in the area, a few months subsequently a new bat, a large, and showy species, was discovered not 40 miles from the locality covered by the Survey.

Series of specimens with records of data and locality in which they are collected are still required—particularly if collected at different seasons of the year. The private collector has still before him a wide field for his efforts. We publish below a list of the

Reports printed in the Journal showing areas covered by the Survey, the time of the year when the collections were made. These Reports give lists of the various species obtained and will serve as a guide to future collectors.

No account of the Survey would be complete without reference to the work of Mr. W. S. Millard, then Honorary Secretary of the Society and Mr. N. B. Kinnear, then its Curator. Its success was in no small measure due to their untiring services in its organization and administration. On Mr. Millard's retirement from India, the task fell to Sir Reginald Spence who as efficiently controlled and brought to completion a task which must remain perhaps one of the finest contributions ever made by an amateur Society to the cause of Scientific Progress.

Report on Collections made by the Mammal Survey in India, Burma and Ceylon: as published in the Journal. The list gives the time of the year in which the collections were made.

HIMALAYAN REGION

Western Himalayas

Srinagar	July-August 1921	Vol. XXXI p.	403
Kangra & Chamba	Feb.-June 1922-23	,, ,,	597
Muree Hills	Feb.-June 1923	,, ,,	606

Central Himalayas

Nepal	August-March 1920-21	Vol. XXIX p.	399
,,	May-May 1922-23	,, XXX	525
Kumaon	August-March 1913	,, XXIII	282

Eastern Himalayas

Sikkim	October-April 1914-15	Vol. XXIV	469
,,		Vol. XXXI p.	612
Darjeeling Dist.	June-August 1915	,, ,,	774
Kalimpong	June-October 1916	,, XXV	275

ASSAM & BURMA

Assam & the Mishmi Hills.	October-July 1919-20	Vol. XXXI p.	383
Naga Hills, Assam		,, XXIX	221
Chin Hills	July-April 1914-15	,, XXIV	758
Chindwin River	June-August 1914	,, ,,	291
Dry Zone, Central Burma & Mt. Popa	July-October 1913	,, XXIII	460
North Shan States	April-June 1913	,, XXII	710
Tungoo Dist.	Nov.-Feb. 1926-27	,, XXXII	545
,, ,,		,, XXXIII	636
Prome Dist.	Sept.-Feb. 1916-17	,, XXVII	553
Pegu Dist.	Nov.-May 1915-16	,, XXV	472
South Tenasserim	Dec.-April 1913-14	,, XXIII	695
Mergui Archipelago	Sept.-May 1921-22	,, XXXI	42

BALUCHISTAN & SIND

N. Sind	Feb.-May 1915	Vol. XXIV	p. 749
Indus Delta	Oct.-Dec. 1922	,, XXXI	40
Kohistan Sind	Oct.-Nov. 1923	,, ,,	403
Baluchistan	Jan.-July 1916-18	,, XXVII	34

INDIAN SUB-REGION

Gangetic Plain

Rawalpindi & Campbellpore	Oct.-Nov. 1923	Vol. XXXI	p. 403
Hissar		,, ,,	,,
Salt Range, Punjab	Feb. 1922	,, ,,	606
Mt. Abu, Rajputana	March-July 1913	,, XXII	684
Gwalior, C. I.	July-Aug. 1914	,, XXIV	309
,,	June-Dec. 1922	,, XXXI	379
Bengal, Behar & Orissa	May-Sept. 1914	,, XXIV	96
Bengal Terrai	Oct.-April 1914-15	,, ,,	469
Bhutan Duars	Oct.-May 1915-16	,, XXV	63

PENINSULA AREA

Bombay Presidency

Cutch	July-Aug. 1911	Vol. XXI	p. 826
Kathiawar	Sept.-Feb. 1912-13	,, XXII	464
Palanpur	March-July 1913	,, ,,	684
East Khandesh	March-May 1911	,, XXI	392
Deccan, Poona Dist.	Jan.-May 1918	,, XXVI	1025
Koyna Valley, Satara	Dec.-Jan. 1914-15	,, XXIV	311
Dharwar	Nov.-March 1911-12	,, XXI	1170
Kanara	Jan.-June 1912	,, XXII	29

Central Provinces.

Berars	May-June 1911	Vol. XXI	p. 820
Nimar	Nov.-Dec. 1911	,, ,,	844
Central Provinces	Jan.-June 1912	,, XXII	45

Madras Presidency.

Vijyanagar, Bellary	July-Aug. 1912	Vol. XXII	p. 58
Mysore	Sept.-Nov. 1912	,, ,,	283
Coorg	Dec.-Feb. 1912-13	,, ,,	486
Nilgiris	June-July 1918	,, XXVI	1031
,,		,, XXXI	613
High Wavy Mts. Madura	May 1917	,, XXVII	545
Travancore	May-Nov. 1915	,, ,,	549

Nelliampathy Hills.

Palnis	April, June, Sept. Dec. 1921 Feb.-June 1922	Vol. XXXI	p. 591

CEYLON

South Ceylon	Mar.-June 1913	Vol. XXII p. 700
Ceylon	Jan.-Mar. 1914	,, XXIV 79

The Survey of Iraq

1915-1919.

Unlike the Mammal Survey, which was organised in every detail and carried out by trained collectors specially engaged by the Society, the Survey of Iraq was the spontaneous work of members of the Society who made large collections in Mesopotamia during the Great War.

Numerous specimens of all kinds were sent to the Society by members and others serving in the Expeditionary Force in Mesopotamia, between the years 1915-1919. They were collected under the discomforts and privations of war, and the history of the gradual growth of these collections is deserving of a special place in the annals of the Society. Many of the specimens were collected close to the enemy's lines, and some were prepared by enthusiastic collectors within range of the enemy's guns.

It is recorded how Col. Magrath caught and skinned a Lesser Shrew in the trenches before Kut, notwithstanding the flies and the Turkish Shells; how Capt. Pitman trained his Regimental Scouts to look out for specimens as well as for the enemy and how Col. Wall, I.M.S., covered the palm trees of Basra with posters advertising a reward for snakes brought in or sent to him. Mention must also be made of the splendid collection of Mammals and Birds made under the most difficult conditions by Sir Percy Cox and Capt. R. E. Cheesman. The fine collection of Invertebrates which was the special work of Dr. P. A. Buxton, Col. Peile's interesting collection of Butterflies made in the plains and foot hills, Capt. Ingoldby's specimens of all sorts, chiefly birds and reptiles from various localities between Baghdad and the Caspian, and finally the collection made by Col. F. M. Bailey and Sir Ernest Hotson in Persia.

A factor that specially influenced the amassing of these collections was the encouragement given to all those who sent specimens or corresponded with the Society by its officials, Mr. W. S. Millard then Honorary Secretary of the Society, and Mr. N. B. Kinnear at that time the Curator. A pamphlet on the 'Animals of Mesopotamia' written by Mr. Kinnear in 1916, and circulated among officers and men serving in the Expeditionary Force, became a frequent book of reference and proved invaluable to all those who were collecting.

Through the 4 years during which the campaign lasted the specimens continued to pour into the Society's offices—as far as possible these were named at the Society's Museum and the donors advised. But many specimens had to remain unnamed and at the conclusion of the hostilities all the material was sent to England where it was submitted to various authorities. The scientific results were published in a series of papers in the Society's Journals which appeared between the years 1918-1923. With the permission of the Society, they were subsequently republished in a single Volume entitled the 'Survey of Iraq Fauna' by the Times Printing and Publishing Company, Basra, and issued under the authority of the Iraq Government. The work so carried out has made a substantial contribution to knowledge of the Fauna of Mesopotamia. How little was known of the Fauna of the region was made evident by the Pamphlet on the 'Animals of Mesopotamia' written by Mr. N. B. Kinnear to which reference has been made. As a result of this Survey no less than 92 species new to science were discovered and described. In addition, the known range of a much larger number of creatures has been extended and a fund of information as to their habits has been gained. Type specimens and duplicates have been deposited in the British Museum and in the Society's Museum and in other institutions.

As regards the Mammals of this great alluvial plain, Capt. Cheesman came to the conclusion that the legends of ancient Mesopotamian forests were mythical. He does not believe that the kings of Egypt came to Mesopotamia to hunt elephants. As huge canals were built there 4,000 years ago it seems probable that even then the country required irrigation. In any event there is only low cover which now harbours wild pig of a kind that was not identified but had striped young and seemed larger than the Indian Pig and too brown for the European Wild Boar. There are Wild Cats, Caracals, Hares, Jackals and Foxes, on the higher ground. Gazelles are abundant, Porcupines were frequently found, and a new species of Ratel discovered.

The most interesting character of the Birds of Mesopotamia on which a great deal of information was obtained, was the relatively small number of permanent residents as compared with the long list of migrants and winter visitors. The river valleys appear to be part of an immemorial route of birds passing between Europe and Asia. In consequence of this unsettled feature of the bird life, the collections yielded almost nothing in the way of new species. The invertebrates on the other hand were little known and crustaceans, butterflies, saw flies and orthoptera supplied a large proportion of forms new to science.

Altogether the Survey carried out under unique circumstances must be recorded as one of the Society's historic achievements, the credit of which rests mainly with those of its members who made these collections amid the trials and difficulties of an arduous campaign.

The Vernay Scientific Survey of the Eastern Ghats,
1929-1931.

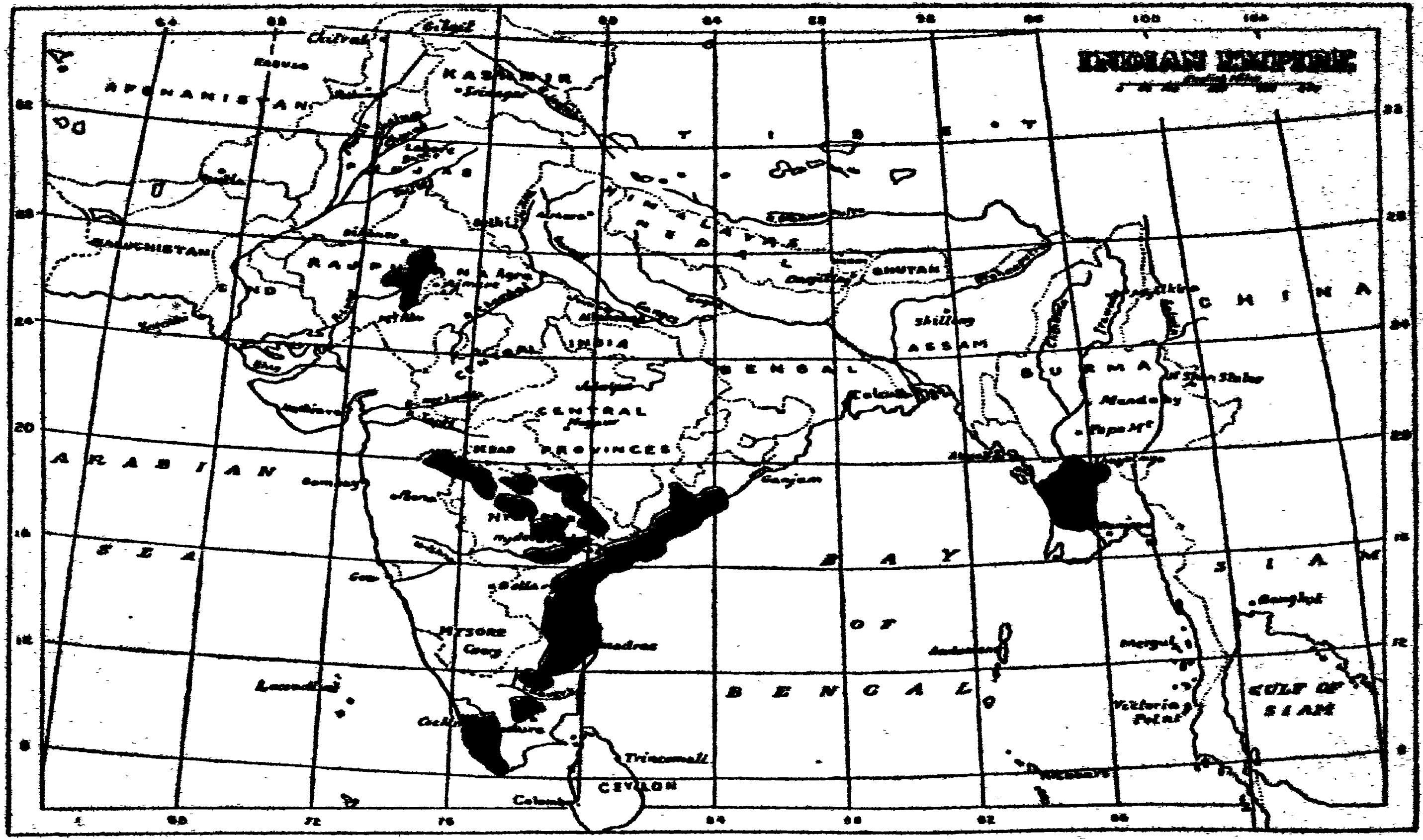
The hope of an Ornithological Survey of South-Eastern India had for a long time been in many minds. The necessity for such a Survey was apparent to all systematic workers who were continually hampered in all directions by the absence of specimens and field notes from practically the whole of the Madras Presidency, with the exception of the Niligiri area from which fairly representative collections had been obtained. The deficiency was still further accentuated with the introduction of the study of local geographical races of Indian Birds. While the collections of the British Museum, of the Society and of other museums contained material obtained in various parts of India, Burma and Ceylon to illustrate how the more widely distributed species varied in the different area of their ranges, the student continually found the chain interrupted by the absence of specimens from the Eastern districts of India. The problem was further complicated by the fact that in some cases the original descriptions of many common Indian birds were based on specimens obtained in this area.

That the Society was able to carry out this very necessary Survey of Southern and Eastern India is due entirely to the generosity of Mr. A. S. Vernay who is one of its Vice-Patrons. The name of Mr. A. S. Vernay is already well known not only in India but across the seven seas as a Patron of Science who combines generosity with an ample appreciation of the field where such generosity may most advantageously be applied. The British Museum and the American Museum and other institutions have benefited by his help. To this Society he has been a most generous benefactor. In January 1929, Mr. Vernay offered to pay all the expenses in connection with the Survey of the Eastern Ghats and left the planning and carrying out of the work entirely to the Society.

The programme of the Survey was based on a careful study of the various districts through which the Eastern Ghat range, and camps were arranged for both on the plains and in the hill ranges. The known type localities for birds described by the earlier naturalists were also borne in mind. The collectors employed for the work were Mr. V. S. LaPersonne, Assistant Curator of the Society, who was in charge of the expedition and attended to bird collecting, and Mr. N. A. Baptista, who was the Mammal collector.

Work was commenced in the Salem District on the 8th of April 1929 where both collectors worked till the end of June, making camps on the plains and at various altitudes in the Shevaroy hill ranges from 500 ft.-5,000 ft. above sea level.

In July, collecting was carried out in the plains round Trichinopoly town and subsequently in the South Arcot District. In August the collectors moved to the South Cuddapah district, where work was carried out in the Palkonda Hills and in the plains till the end of September. Unfortunately, the Mammal collector N. A. Baptista went down with appendicitis early in September and had to return to Bombay. Mr. LaPersonne continued to collect and in October 1929 went to the Nalla Hills in the Kurnool District where he collected till the beginning of January making collections in the hills and subsequently in the Cumbum Valley. In January 1930 collecting was carried out in the Godaveri Delta. In February LaPersonne moved to the Vizagapatam District where he collected in the hill ranges and in Jeypore till the end of May. The Survey thus covered practically the whole area traversed by the



Map showing areas worked by the Society's Bird Surveys.

Eastern Ghats. In all about 1,500 birds were collected by Mr. V. S. LaPersonne. In the course of a year's collecting in places that were often wild and very unhealthy, he carried out the work with energy and perseverance and his collections were marked by uniform level of technical skill and the preparation that can seldom have been surpassed.

The bird collections obtained by the Survey were worked out by Mr. H. Whistler and by Mr. N. B. Kinnear of the British Museum. Mr. H. Whistler, who up to the time of his leaving India was a member of the Society's Managing Committee, has an established reputation as one of the principal authorities on Indian birds. His contributions to Indian Ornithology are characterised by the careful painstaking study upon which his writings are based.

The results of the ornithological work of the Survey are issued in a series of papers by Messrs. Kinnear and Whistler which are still in course of publication in the Society's Journal. The papers are issued in the form of an account of the Birds of the Madras Presidency, and include all the species which have been recorded from the area whether obtained by the Survey or not. The papers introduce numerous important changes in nomenclature—specific and sub-specific—adopted in the new *Fauna* by Mr. Stuart Baker, which were made necessary largely by a study of the additional data provided by the Survey. A large number of new forms have been described, and much new light has been thrown on the distribution and races of other species already well known in other parts of India. The distribution of even the most common birds in India is imperfectly known and the account of the Survey work while it adds considerably to existing knowledge also serves to underline this fact and indicates the existing deficiencies which can be filled up by the work of local observers.

Ornithological Expeditions in the Persian Gulf Islands, Mesopotamia, and Persia, 1921-1923.

In 1921, Sir Percy Cox who was then High Commissioner in Mesopotamia engaged the services of Mr. V. S. LaPersonne to carry out a Survey of the Persian Gulf Islands.

Sir Percy in spite of his arduous duties during the Great War was a frequent contributor to the Society's collections and in collaboration with Major R. E. Cheesman made the splendid collection of Mesopotamian Birds known as the Cox-Cheesman Collection.

As early as 1905, and again in 1906 Sir Percy as a Political Officer in Persia visited some of the islands of the Persian Gulf and collected birds, skins and eggs many of which are now in the Society's Museum. In 1921 he again collected and made observations in the islands with Major Cheesman. Before leaving he arranged for Mr. LaPersonne to collect in these islands and generously offered to meet all the expenses of the trip.

Tanb Island, situated at the Eastern end of the Persian Gulf in Lat. 26′ 16° N. and Long. 55° 19′ E., whose lighthouse is a familiar landmark to travellers to Basra from Indian Ports, was chosen as a suitable place for LaPersonne to commence work. The lighthouse, it was believed, would attract migratory birds and one of the purposes of the Survey was to discover to what extent the migration could be observed and what species halted on the Island during the Spring passage. Thanks to the kind co-operation of the Director of the Royal Indian Marine permission was obtained for LaPersonne to stay in the Island.

LaPersonne collected on Tanb Island during the months of March and April 1921, when he also visited the neighbouring Island of Nabi-u-Tanb. In April he collected at Farsi and Arabi two island sand-banks about 15 miles apart situated almost in the centre of the Gulf between Bushire and Rass-al-Bidya on the Arabian Coast. He then went to Kubbar a small inlet 20 miles from the Kowiet coast and 32 miles north of Kowiet. In March 1923 LaPersonne paid a flying visit to Tanb. He returned to the Gulf in June when he collected on Auhat Island which is situated at the entrance to Kowiet Bay and in July went to the Island of Nabi-ul-Farur 45 miles West by S. of Tanb. The island is about 4 miles in length by 2½ miles broad and rises in dark volcanic hills to a height of 465 ft. The belief that the island might be the breeding ground of the Persian Shearwater (*Puffinus persicus*) led Sir Percy to send LaPersonne to collect there. The breeding ground of this bird still remains undiscovered, though it must be on one of the islands of the Gulf. But until its correct breeding season is known it is useless to attempt to discover its breeding haunt.

The collections of birds' skins and eggs made by LaPersonne in the Gulf Island together with the collections of Sir Percy Cox and Major Cheesman were presented to the British Museum and to the Society. They formed the basis of a paper by Dr. Claud Ticehurst published in the Journal of the Society which incorporates the results of the Survey. While lighthouses prove a definite attraction to migratory birds in the clouded skies of northern climes it was discovered that they had little effect on the birds in the clear atmosphere of a Persian Gulf night and the lighthouse on Tanb failed to add a single specimen to Mr. LaPersonne's collection. 63 species of birds were found on Tanb Island the majority of which are passage migrants.

On Nabi-u-Tanb, LaPersonne was able to secure the first absolutely authentic egg ever taken of the Tropic Bird (*Phaeton aetherius indicus*). But the most interesting discovery made during the exploration of the Persian Gulf Islands was the finding by Sir Percy Cox and Major Cheesman of the breeding quarters of the Socotra Cormorant (*Phalacrocorax nigrogularis*) a species first discovered on the island of Socotra in December 1898. The eggs of these birds are most interesting as they exhibit a remarkable variation from any previously known eggs of Cormorants and Darters.

Mesopotamia

1920-1923.

When Sir Percy Cox and Major Cheesman returned to Iraq in 1920, they were able to a very large extent to supplement the collections made during the Mesopotamian Campaign. They enlisted the support of His Majesty King Faisal and of various officials who sent specimens to them. In 1921, as recorded previously, the Society's collector Mr. LaPersonne was engaged by Sir Percy to explore the Islands of the Persian Gulf. As his work on the Islands was restricted mainly to particular seasons of the year, he spent the intervening periods between 1921 and 1923 in collecting in Mesopotamia. LaPersonne undertook special trips to Dohuh and Mosul in the North; and collected in the Euphrates Marshes, at Fao in the Persian Gulf and at Bubyan and Warba Islands which lie at the head of the Gulf and practically form part of the mainland. Collections were also made at Dara, Boonah and Qabr-un-Ňokhuda, 3 islands in the Khor Musa at the head of the Gulf, N. E. of Fao. Sir Percy Cox and Major Cheesman collected largely round Baghdad and undertook various trips to the plains, while Major Cheesman made a special trip to the Pusht-i-kuh east of Ali Garbi in Lauristan.

In all a very considerable collection was got together, the avifauna of areas not touched during the war time Survey of Iraq, was investigated and many gaps in the knowledge of Iraq birds were filled and former observations confirmed.

The collections were reported on in a paper by Dr. Ticehurst published in the Journal of the Society, Vol. XXI, page 91 which form a supplement to his previous paper on the Birds of Iraq.

Proceedings of the Fiftieth Anniversary Jubilee Meeting.

A special Meeting to commemorate the Fiftieth Anniversary of the Bombay Natural History Society was held at the Cowasjee Jehangir Hall on the 10th August 1933 at 9-45 P.M. Sir Hugh Cocke, the Sheriff of Bombay, was in the Chair. His Excellency the Viceroy was unfortunately unable to be present, but a special message was received from His Excellency the Governor of Bombay, the President of the Society, congratulating the Society on the great work it had accomplished during the 50 years of its existence and wishing it all success in the future.

Mr. P. M. D. Sanderson, Honorary Secretary, gave a brief History of the Progress and Development of the Society. He was followed by Mr. S. H. Prater, the Society's Curator, the subject of whose address was the 'Problem of Wild Life Protection in India'.

The text of Mr. Prater's address on 'Wild Life Protection' appeared on page 1 of the Supplement in Vol. XXXVI, No. 4, of the Journal. In this connection the Society must record its appreciation of and gratitude to those who have made it possible for it to publish the Supplement which deals with the Wild Animals of the Indian Empire and the Problem of their Protection. Mr. F. V. Evans is paying for the large number of illustrations, coloured and black and white, which will appear with the series. A special donation of Rs. 5,000/- has been received from His Highness the Maharaja of Travancore, who has recently been elected a Vice Patron of the Society, a donation of Rs 500/- from H. H. the Maharaja of Jodhpur, Rs. 250/- from H. H. the Maharaja of Bhavnagar, Rs. 100/- from the Raja of Chamba, Rs. 100/- from the Maharaja of Rajgarh, Rs. 500/- from the Maharaja of Junagadh, and Rs. 100/- from the Maharaja Rana of Jhalawar, to cover the cost of printing these articles which the Society hopes to make available for distribution.

The creation of sane public opinion on the question of Wild Life is essential to the success of any effort directed to this end. A necessary preliminary to the creation of such opinion is the spread of knowledge about our Wild Life, from this alone can come that interest which will engender a wider recognition of the need for its preservation.

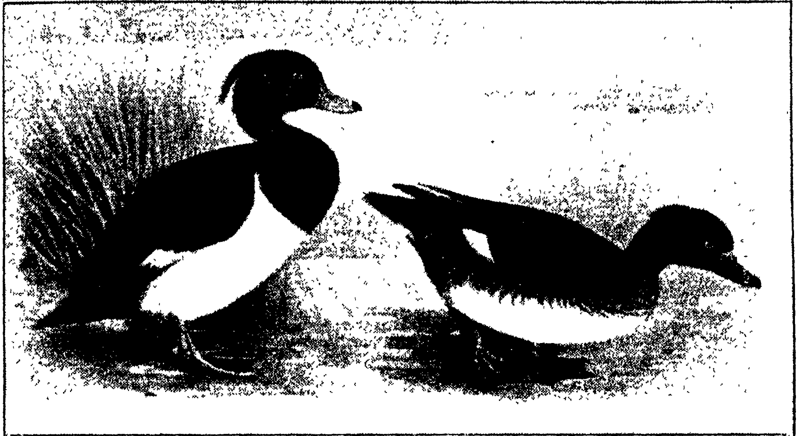
The thanks of the Society are due to all those authors who have contributed to the series of articles dealing with the subject and have so helped in the cause.

The thanks of the Committee and Members of the Society are due to Mr. A. S. Vernay who has given the Society a special donation to meet the cost of printing this Special Number.

GAME BIRDS OF INDIA

BY

E. C. STUART BAKER



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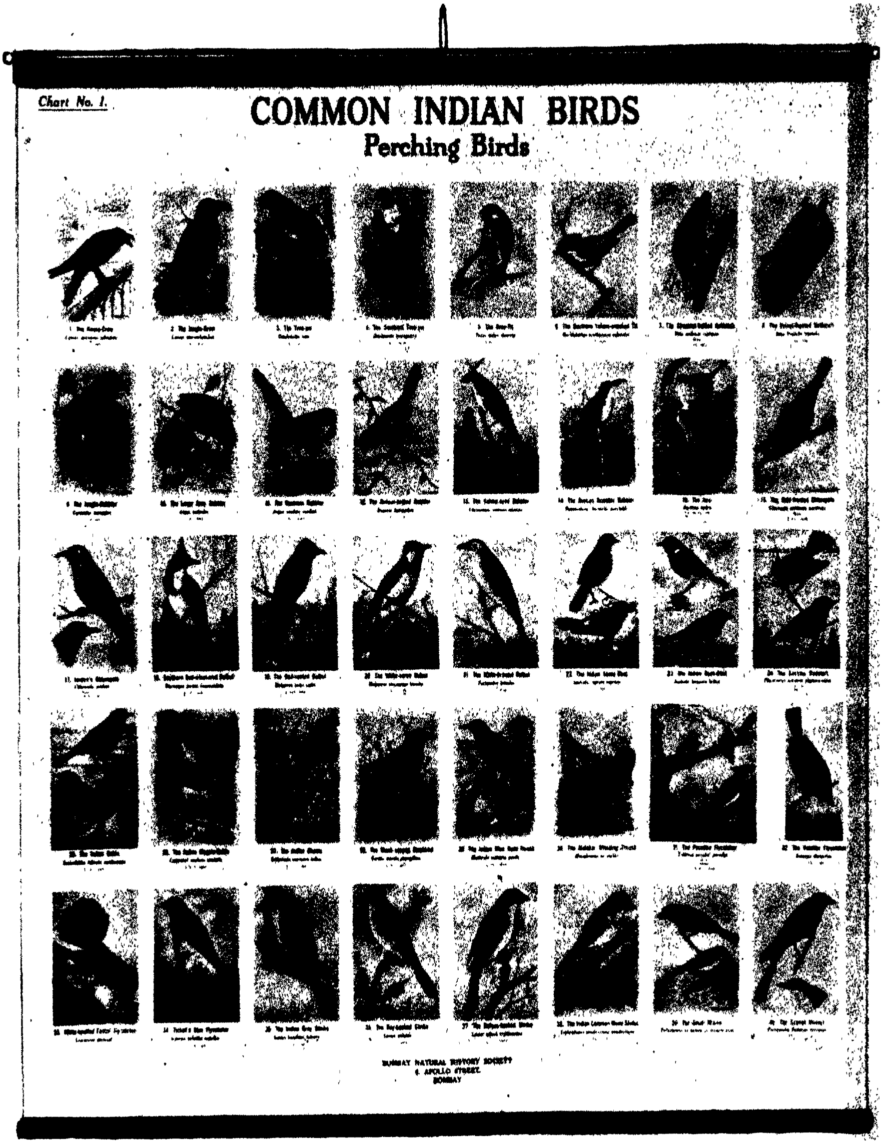

Chart No. 1.

COMMON INDIAN BIRDS

Perching Birds

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6, APOLLO STREET,
BOMBAY

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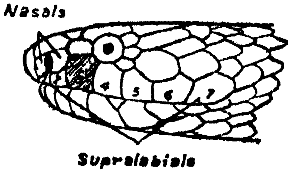

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